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Safeguarding Grinding Wheels

Precautions Taken by the Maker to
Market Only Safe Wheels—Causes
of Accidents—Good and Bad Guards

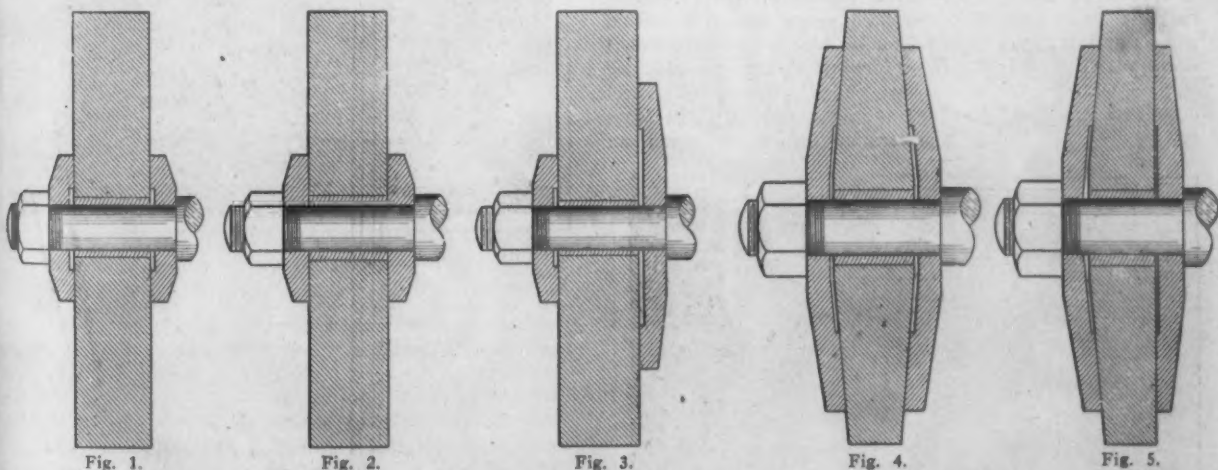
BY F. B. JACOBS

The grinding wheel is without a doubt one of the prime factors in cutting down the cost of production in our present day manufacturing, thousands of them being in constant use. The demand in this country is supplied by some thirty manufacturers, ranging from the one largest concern, whose agencies are to be found in every part of the world and whose stock of ready-to-ship wheels run into hundreds of thousands, down to the smaller concerns who depend on local orders for existence.

When we stop to consider that this vast output of wheels is used under all sorts of conditions, both good and bad, it is evident that serious accidents are bound to happen if precautions for proper safeguarding are not taken. From my own practical experience with grinding wheels covering a period of many years and from my

country, spares no pains or expense to make sure that none but perfect wheels are placed on the market. It is not my intention to explain the various stages through which a grinding wheel passes before it reaches the shipping room, as this would be getting too far away from the subject. I will, however, touch briefly on a few important steps that invariably prove the soundness of the wheel during the process of its manufacture.

As soon as the wheels come from the vitrifying kilns, they are first tested for soundness by tapping with a light hammer and carefully inspected for other imperfections, burned spots, etc., this inspection being under the direct supervision of trained experts. If a wheel fails to give out a true bell-like tone when tapped with the hammer, or if burned spots are in evidence, the wheel is speedily condemned as unsafe and consigned to the



DIAGRAMS TO ILLUSTRATE DIFFERENT METHODS OF MOUNTING GRINDING WHEELS

observation of the conditions under which grinding wheels are used in practically every branch of manufacturing, I am led to believe that fully 95 per cent. of the accidents due to the breakage of grinding wheels are wholly uncalled for and could be avoided by a little reasonable precaution on the part of both employer and employee.

The following is a list of the principal causes of grinding wheel failures which I will endeavor to explain, each cause being taken up separately for the sake of convenience:

- Imperfect wheels.
- Abnormal wheel speeds.
- Faulty mounting of wheels.
- Lack of attention to work rests.
- Loose spindles.

Imperfect Wheels

The reliable manufacturer of grinding wheels, whose products are to be found in every city and town in the

scrap pile. The wheels that pass this inspection are sent to the lathe room for truing.

The sides of the wheels are trued by means of chilled burrs held in a holder not unlike the ordinary grinding wheel dresser familiar to every mechanic. In this operation the wheel is securely held in a chuck, the tool passing over the surface to be trued by means of an automatic feed. The wheel is then bushed with lead, mounted on a heavy spindle, and the periphery trued.

The next operation of importance is called speeding, and is the final test that proves the soundness of the wheel. This operation is in charge of responsible men, who at the close of each day's work subscribe and swear to the recorded tests before a notary public, the number and conditions of each test being entered in a book kept for that purpose and a certificate attached to the tested wheel. In the speeding test each wheel is run at not less than 70 per cent. above the normal operating speed (5000 ft. surface speed per minute), thereby subjecting it to



Fig. 6—Unguarded Wheel for Cutter Sharpening

fully twice the centrifugal stress of normal working conditions. From this it is readily seen that it is impossible for an imperfect wheel to pass the speeding test as the centrifugal stress would certainly burst it.

Extreme care is also exercised in packing wheels for shipment, to avoid accidents in transit. The larger wheels are packed in individual boxes with sawdust. The smaller wheels or rather comparatively thin wheels receive the added protection of corrugated strawboard. Before a wheel is mounted for use it should be lightly tapped with a small hammer. If it gives out a bell-like sound it is safe. If it gives out a dull sound it should be condemned as unsafe.

Accidents through defective wheels are happily very rare. I myself have investigated many cases of broken wheels and have yet to find a single case where an accident was caused directly by imperfections in the manufacture of the wheel. While we are on the subject of wheel imperfections, the following may be of interest. In May, 1902, the Association of German Engineers began an



Fig. 7—Unguarded Wheel for Cutter Grinding

exhaustive series of speed tests of abrasive wheels. These tests were conducted by Professor Gruber of the technical high school of Dresden. All manufacturers were invited to submit a 20-in. wheel to be speeded until it burst. In all about 60 wheels, including almost all standard makes, both American and foreign, were tested in this manner. The result as a whole demonstrated the entire safety of all makes of wheels when properly used, for while the proper operating speed for a 20-in. wheel is 955 r.p.m., the poorest record made by any wheel tested was 2615 r.p.m. before bursting. The best record made by any wheel tested was 4340 r.p.m., the wheel in this case being carborundum taken from regular stock.

Abnormal Wheel Speeds

Reliable makers of grinding wheels always mark on the tags of regular wheels the proper operating speed, and the consumer, or in the case of a large concern, the millwright or the mechanical engineer, should pay a little attention to this important detail. The proper operating speed for a general purpose wheel in vitrified bond is 5000 ft. per min. surface speed. This is a safe speed and it is productive of economical results. The thin special wheels made in vulcanite bond can be run much faster with perfect safety; in fact, a vulcanite wheel has to be run at a very high speed to show efficiency.



Fig. 8—Unguarded Wheel for Cutter Grinding

There are several reasons why grinding wheels are overspeeded. Indifference on the part of the millwright who installed the grinding stand is sometimes the cause. Not having just the proper sized pulley for the line shaft, he is likely to substitute a different size, often larger than is called for, which of course overspeeds the wheel. Many grinding wheel stands are equipped with a two or three-step cone, the object being to speed up the wheel as it wears down. Neglecting to shift the belt to the lowest speed after installing a new wheel results in overspeeding. While grinding wheels stands of the above type are without doubt very handy as regards speed adjustments, they are at the same time a source of constant danger, as an indifferent or in some cases a green workman is liable to shift the belt to suit himself, ignoring limits of safety. A safe and at the same time an economical way to use general purpose wheels, one that is giving entire satisfaction in some of our largest manufacturing concerns, is always to buy wheels of a given size. When new these wheels are mounted on a stand running at the proper speed for the diameter of the wheel. As soon as the wheels are worn down, say 2 in., they are placed on another stand running at a higher speed, and so on until the wheel is worn down to a stub.

Faulty Mounting of Wheels

In mounting a grinding wheel, the lead bushing should slip readily over the spindle. If the bushing is a little



Fig. 11—Sheet Metal Wheel and Spindle Guard



Fig. 12—Wheel and Belt, Both Guarded

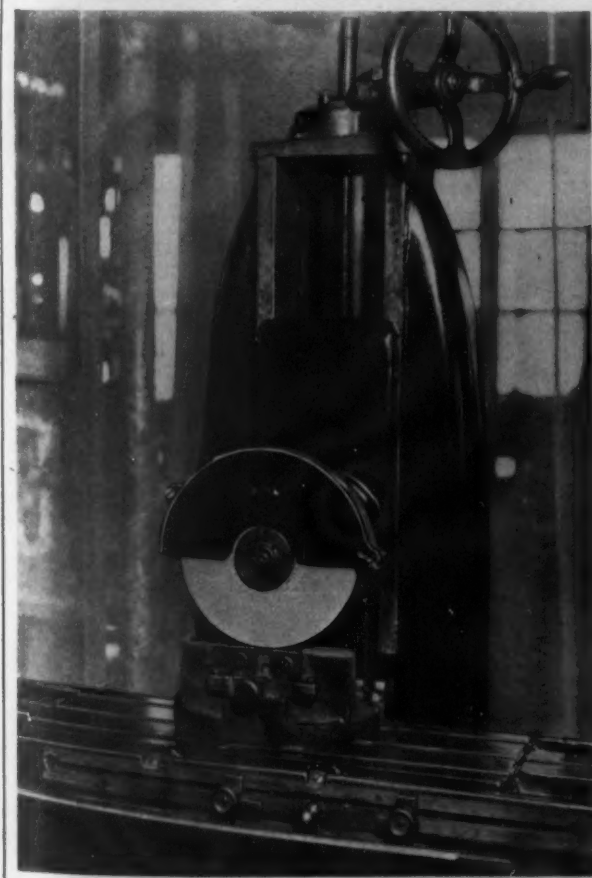
small, as sometimes happens, this defect can readily be remedied by means of a bearing scraper or an old file. The operator who neglects this simple precaution and mounts a wheel by wringing it on the spindle, is taking chances of meeting with a serious accident, as tight wheel bushings are the source of as many accidents as all other causes put together.

The reason for this is quite apparent, as lead, the material with which grinding wheels are generally bushed, expands readily from heat. When the spindle of the grinding stand runs warm, as it invariably does after being in use for a few hours, the spindle expands a little from heat. The lead bushing readily absorbs a part of the heat which expands it several thousandths of an inch, owing to the fact that lead expands more under a given temperature increase than steel. The expansion of the lead throws an undue stress on the wheel, which added to the stress that the wheel is subjected to from centrifugal force, is sufficient to burst it.

Wheel flanges should be at least one-third of the

diameter of the wheel and should always be recessed, as shown in Fig. 1. Plain flanges, as shown in Fig. 2, are dangerous as they do not always grip the wheel properly, a slight crowning of either wheel or flange being sufficient to cause them to grip the wheel near the arbor only. Fig. 3 illustrates another source of trouble caused by wheel flanges belonging to different grinding stands becoming mixed. The outer flange being smaller in diameter than the inner one, brings an undue side-strain on the wheel.

Two types of safety flanges are shown in Figs. 4 and 5. While flanges of this type will prevent a split fragment of a wheel from flying, their use is not at all common. In fact, the average manufacturer considers them a nuisance, taking the stand that different grinding wheel manufacturers have failed to agree on what constitutes the proper degree of taper for flanges of this type. The result is that a hopeless confusion of flanges accumulate in cases where wheels of different makes are used in the same department. As a matter of fact, safety



Figs. 9 and 10—Two Types of Guarded Surface Grinding Wheels



Fig. 13—Sheet Steel Guard, Arranged for Adjustment

flanges that do not fit the wheels perfectly are worse than no flanges at all. With wheels made by a reliable maker, properly mounted and run at the speed recommended, safety flanges are uncalled for.

Lack of Attention to Work Rests

When the nature of the grinding will permit, it is a good plan to use wheels without a work rest. On comparatively heavy work a rest is of course necessary, as the workman has to utilize his strength in holding the work to the wheel. Rests are also necessary on tool-grinding wheels, and other wheels used for general purposes. It is with the last two classes of wheels that accidents occur by getting the work caught between the wheel and the rest. This generally results in a broken wheel and consequent injuries to any one who happens to be in the path of the flying fragments. The only way to avoid accidents is to keep the wheel true and the rest adjusted close—within $1/32$ in. of the face of the wheel. In justice to the manufacturer it should be stated that accidents of this kind are in nearly every case caused by carelessness on the part of the operator. His common sense and mechanical instinct should tell him that he is taking desperate chances in ignoring a wide gap between the wheel and the rest.

Loose Wheel Spindles

Loose wheel spindles often cause wheels to break as they allow the wheel to run out of balance and also make it impossible to keep the rest adjusted close to the wheel. Babbitt metal, even of the highest quality, is cheap as compared to the consequences of injuries, and this is one reason why the spindles of grinding wheel stands should be rebabbitted as soon as they show noticeable signs of wear.

Wheel Guards

Many states have passed laws requiring manufacturers to equip the grinding wheels used in their plants with guards, the object being to keep the pieces of the wheel from flying in case of accident, not to keep sparks out of the operators' eyes as one might judge from the flimsy guards sometimes seen over grinding wheels. While wheel guards are not necessary where reliable wheels properly mounted are in operation, their use is to be strongly recommended as they are the direct cause of preventing many fatalities from accidents caused by carelessness on the part of the operator.

It is, however, impractical to use guards over the smaller wheels used for cutter sharpening, and other work of like nature. Figs. 6, 7 and 8 illustrate cutter sharpening operations. To place guards over these wheels would be an impossibility, as the size of the wheels and their relative position to the work are different with every operation. Accidents with wheels of this kind are so rare as to cause no comment, there being two reasons for this: First, these small wheels are comparatively strong for their size, seldom breaking unless

injured by being dropped; and again there is no reason for standing directly in their path.

The photographs referred to were taken several months ago by the writer for advertising purposes. In each case I asked the operator to assume a working position, nothing being said about standing out of the path of the wheel, as I did not have the subject of this article in mind at that time. However, the operator is out of the path of the wheel in each case, and as he assumed this position naturally, one would infer that a skilled mechanic prefers to keep out of the path of cutter grinding wheels. As a matter of fact he does not because he is afraid of the wheel breaking, but because he has learned from experience that to stand directly in the path of an unguarded wheel nearly always results in particles of the abrasive becoming lodged in the eyes, which in some cases require the services of a skilled surgeon to remove.

Figs. 9 and 10 illustrate two types of surface grinding wheels, each of which is protected by a suitable guard. Guards over wheels used for surface grinding are generally considered necessary, the reason for this being that surface grinding wheels frequently break as they are of a soft, open bond. With guards of the types shown in these illustrations, serious accidents are impossible. With the modern cylindrical grinding machine, accidents from wheel breakages are practically impossible, as the wheel is always protected by a heavy guard. While the operator generally stands directly in the path of the wheel he runs no chances of being injured, as it would be practically impossible for a piece of the wheel to strike him. Machines of this kind are never used without wheel guards. In fact, a guard on a cylindrical grinding machine is a necessity to keep the water from flying all over the shop, as this class of grinding is invariably done wet.

Figs. 11 and 12 are from photographs taken in the shops of two of the well-known railroad systems. By referring to Fig. 11 it is seen that the guard, which is made of sheet metal of sufficient thickness to withstand the shock of the wheel fragments in case of accident, is also provided with a hood to cover the projecting threaded end of the spindle. The object of this hood is to prevent the workman's clothing from being caught. While the workman in this illustration is grinding a comparatively small piece of work, he is taking no chances as the work rest is placed close to the wheel.

The tool grinder shown in Fig. 12 is of a type often seen in railroad shops. It is provided with a heavy hood; the work rest is properly adjusted, and a guard is provided to prevent the workman's clothing from being caught in the driving pulley. The reason that railroad shop employees are so adequately guarded against accidents lies in the fact that the shop foreman and master mechanic in charge are fair-minded, conscientious men



Fig. 14—Novel Form of Sheet Metal Wheel Guard

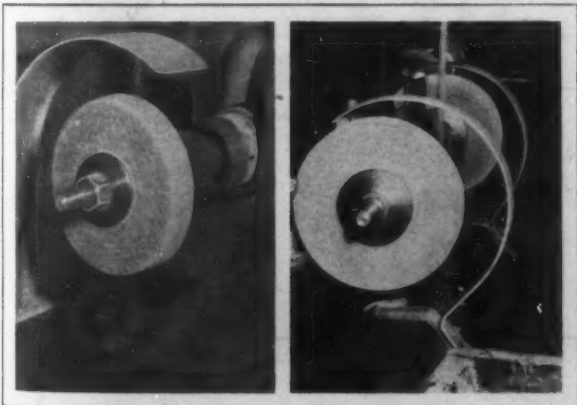
who have gradually worked up from obscure positions to ones of trust and who, therefore, consider the workman's welfare from their own actual shop experiences.

Fig. 13 illustrates another tool-grinding wheel that is properly guarded. The hood, which is made of $\frac{1}{4}$ -in. sheet steel, is securely bolted to the frame of the machine and is provided with an adjustment which allows it to be moved toward the wheel as the wheel is reduced in diameter. This is important, as a guard should be placed reasonably close to prevent the wheel fragments from flying in case of breakage. The work rest in this instance is placed close to the wheel. Although the machinist in this illustration is standing in front of the wheel, he is taking no chances as it would be impossible for a section of a wheel guarded in this manner to get away from the hood. The guard over the driving pulley deserves mention. It is made of $1\frac{1}{2}$ -in. iron pipe and covered with heavy wire netting.

Two sheet metal guards are shown in Fig. 14; they are easily removed when it is necessary to change wheels, as the guard in the foreground shows. The working position of the guards are shown by the guard in the background. These guards are adjustable, and can be moved toward the face of the wheels. The guards are novel in construction, the body being cut from a piece of heavy sheet metal.

Figs. 15 and 16 illustrate a wholly inadequate type of grinding wheel guards that unfortunately is in common use. While guards of this kind are often passed by factory inspectors who are lacking in practical knowledge, they are worse than none at all as a section of a burst wheel would crumple them like so much cardboard owing to the insufficient strength of material.

In cases where grinding wheels burst, resulting in fatalities, it is a difficult matter to determine who is at fault, the employer or employee. Is it justice to compel a manufacturer to pay heavy damages for fatalities brought about (as they often are) by wanton carelessness on the part of the operator? If the employer neglects to have suitable guards placed over grinding wheels,



Figs. 15 and 16—Inadequate Guards

where there is a law requiring him to, it would seem that he was criminally negligent in cases where fatalities result from bursting grinding wheels.

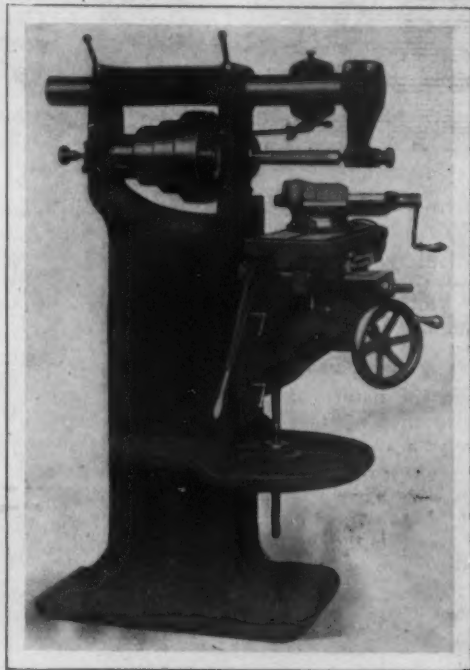
However, suppose the wheel is properly guarded and the operator himself removes the guard for some reason and by so doing is injured. Should the employer be compelled to pay damages in this case? Assuming that one operator removes a wheel guard and neglects to replace it, another operator is injured on this same wheel a short time afterward, who is to blame in this case? The operator who removed the guard, the operator who afterward used the wheel without the guard or the employer who is ignorant of the whole proceeding? These of course are questions for the courts to decide, and decisions in cases of this kind are not easily reached by any means.

In questions where the safety of employees is concerned, labor and capital should co-operate. The workman should bear in mind the fact that it is impossible for him to earn a living without taking some risk, and where the employer provides all possible safeguards against accidents, the employee should see to it that these safeguards are not removed or destroyed.

New Hand Milling Machine

A hand milling machine with either lever or screw feed for the table and a special type of vise is being built by the John Steptoe Shaper Company, 2951 Colerain avenue, Cincinnati, Ohio. The use of two types of table feed enables the machine to be used for the rapid production of work as well as the turning out of accurately machined pieces. The lever feed is intended to be used by the operator when the rapid milling of small articles is being performed and when very accurate work is required the screw feed which has a collar graduated in thousandths of an inch is substituted.

The vise with which the machine is equipped is somewhat different from the one ordinarily employed on a



The New Hand Milling Machine Built by the John Steptoe Shaper Company, Cincinnati, Ohio

milling machine. The main point of difference is the providing of a graduated base which enables the vise to be swiveled to any desired angle. The pan at the bottom catches the chips and the oil from the table and prevents them from falling on the floor, while it can also be employed as a tool rest. The bearings are of high grade phosphor bronze and are tapered and threaded on the ends to take up wear. Felt oilers provide the necessary lubrication for the bearings.

If desired the machine can be built with a lever elevation for the knee and power feed for the table. The crated shipping weight of the machine as illustrated is approximately 1300 lb.

An Ohio Blast Furnace Merger

The Marting Iron & Steel Company has filed notice of increase in stock from \$200,000 to \$2,000,000. This is the result of a merger of the Marting Iron & Steel Company, Ironton, Ohio, Ironton Iron & Steel Company, Ironton, Ohio, and the Lawrence Iron Company, Culbertson, Ohio. Col. H. A. Marting will be president and general manager of the new company. The Lawrence furnace is to be enlarged to 200 tons daily capacity. It is also the intention of the new company to open large ore deposits in Michigan and to build a by-product coke plant at Ironton or Portsmouth, Ohio.

Oxy-acetylene cutting torches were used by the Davis-Bournonville Company for cutting away the wrecked steel in the crushed bow of the Fall River Line steamship Commonwealth, which has been in dry dock at Hoboken since her collision with the United States battleship New Hampshire. The cutting required several operators for two days, but the oxy-acetylene torches made short work of what would otherwise have been a much more difficult task.

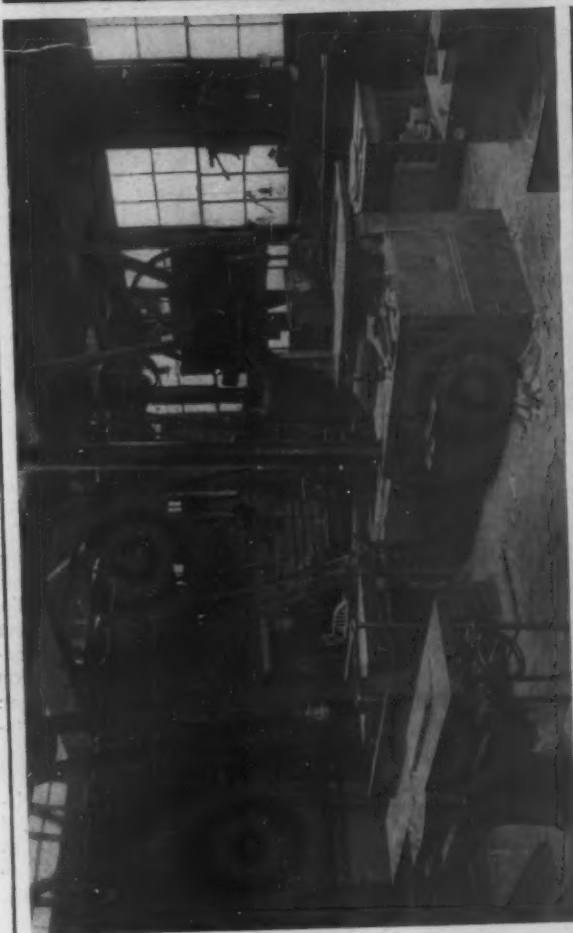
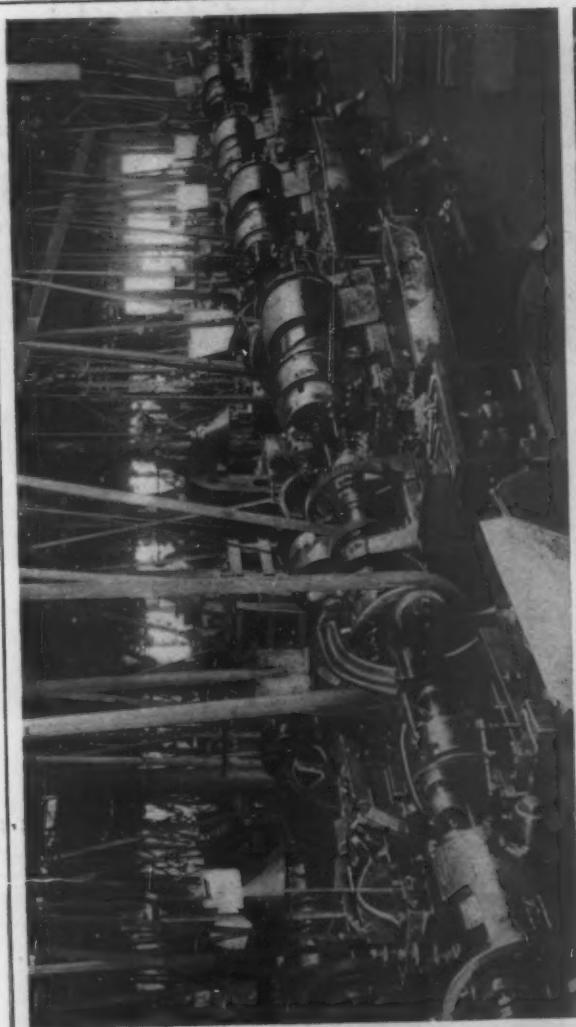


Fig. 5—View of the Cleveland Automatic Machine Section
Fig. 7—View of the Whitton Section of Milling Machine

Fig. 4—Part of the Pattern Shop
Fig. 6—View of Bevel Gear Generating Machines

Equipment of a Modern Gear Factory

Views in the Plant of the Boston Gear Works, Indicating the Character and Scope of Machinery for Making Gears of All Types



Some idea of the equipment of an establishment devoted exclusively to the manufacture of gears may be obtained from the accompanying reproductions of photographs taken in the plant of the Boston Gear Works. This factory, which is located at Norfolk Downs, Mass., is notable for its size and the large variety of gears turned out. The views are also calculated to offer suggestions to those having in hand the problems of equip-

ment and design of industrial plants requiring the working of metals, and they are of course an indication of the resources of the Boston Gear Works. The firm started business in Boston in May, 1891, with 12 men under the management of Frank Burgess, general manager of the plant. In the spring of 1906 enlargement became necessary and a modern one-story factory of sawtooth roof construction, except for the office department, was built in Norfolk Downs, about six miles from Boston. This plant was completely destroyed by fire November 27, 1909. In less than one week after the fire, however, gears were cut in a nearby building on machinery taken from the ruins. On February 10, 1910, a new factory, incorporating the suggestions of experience, was completed on the site of the old structure, and it was put on full time with 125 employees, to whom Mr. Burgess is wont to give considerable credit for the successful expansion of the business.

The new factory was also of sawtooth roof construction, which has proved satisfactory. A sketch of the plan of the works is given in Fig. 1. The office is placed on the first floor to give uniform light and is in direct communication with the factory. There are 29,000 sq. ft. of floor space in the main building, and the total floor space, including that in other buildings, aggregates 37,000 sq. ft. As indicated, the main building is divided into two parts by a fire wall. The factory section is 90 x 131 ft. and

the office section, 90 x 71 ft. Fig. 1 shows the buildings.

Besides three offices in the office section, the pattern shop, two gear stock rooms, the tool room and the shipping room are located in this part of the works. In Fig. 2 is shown a view of the bins used for keeping stock and in Fig. 4 is shown a part of the pattern shop in which some safety devices may be noted. The three offices, being those of the general manager, the bookkeepers and the jobbers, are arranged so that quick communication can be had with one another, as well as with the main factory section. In the basement under the office section are storage, millwright and experimental rooms, a steam heating plant and a 50-hp. De La Vergne oil engine.

The main power plant is located in a separate building, 31 x 32 ft., erected in 1910. This is adjacent to the fire wall of the main factory building, and an 85-hp. Hornsby Akroyd De La Vergne oil engine, as shown in Fig. 3, is installed. There is also a 50-hp. De La Vergne engine in the basement, under part of the main factory building, driving an electric generator and pumps. In this part of the works there are also several cutting-off machines and racks for storage of steel.

The main factory is divided into 14 separate departments, each under a working foreman. The arrangement plans a scientific routing of work in process of manufacture. There are all told 225 machines, 75 of which are automatic, and most of the latest design. What is called the Model department, turning out small gears, includes some 40 turning and gear cutting machines, of which 10 are automatic. Most of these machines were designed and built by the Boston Gear Works.

A number of the sections of the main factory are shown in the accompanying illustrations. For example, in Fig. 5 is given a view of

the Cleveland automatic section, where there are seven Cleveland automatic turning machines handling bar stock up to 6 in. in diameter. Here are also four Acme automatic screw machines. Another section contains three Potter & Johnson automatic chucking machines, one plain chucking machine and one Jones & Lamson, one Prentice, one Bullard and two automatic Fay lathes. Another sec-

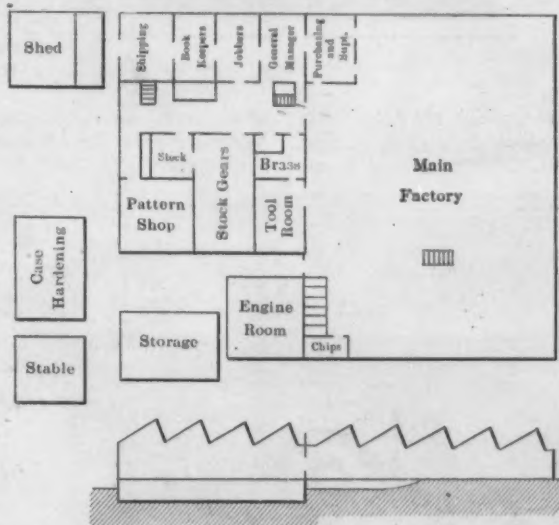


Fig. 1—Plan and Elevation of the Boston Gear Works

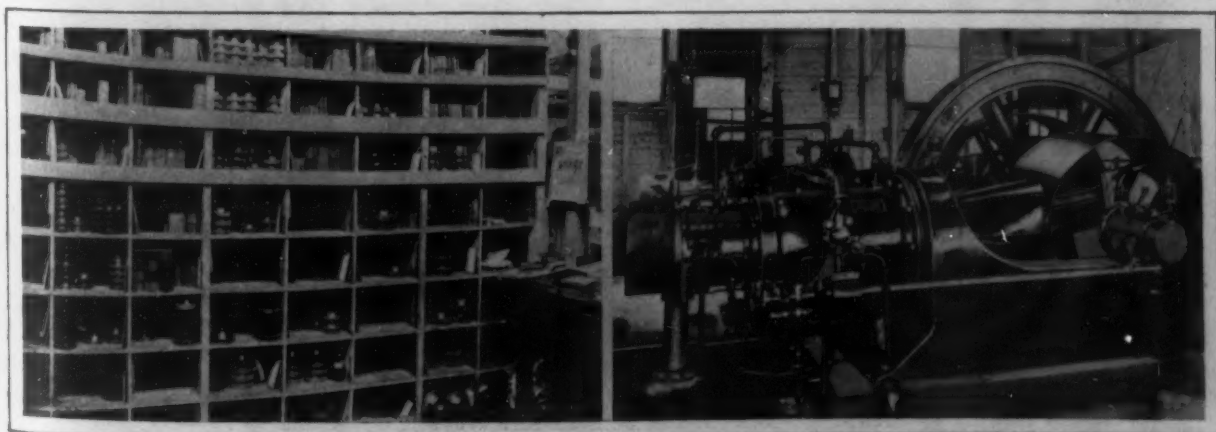


Fig. 2—Part of the Gear Storage Bins

Fig. 3—One of the Oil Engines Providing Power

tion contains six Gleason bevel gear generating machines and three single tool planing machines, taking work up to 48 in. Fig. 6 is a view in this section. The Whiton section, shown in Fig. 7, comprises nine automatic milling machines for cutting spur gears, sprocket wheels and bevel gears of small diameter. The so-called spiral section contains 10 machines for cutting spiral and worm gears of medium diameter. The hobbing department includes seven machines for cutting spur, helical and worm gears up to 10 ft. in diameter. Six Fellows gear shaping machines, including one rack cutter, five Gould & Eberhardt and two Newark automatic spur and sprocket gear cutters and one Brainard automatic gear cutter comprise the Fellows and Gould & Eberhardt department, Fig. 8. Gears up to 74 in. in diameter can be cut in this section. The lathe, drilling and miscellaneous department contains 22 machines. The tool section comprises a total of 12 machines, among which are lathes and milling and special hobbing machines. The grinding department comprises a total of nine universal, plain and internal grinding machines, which are not shown.

In 1911 a new case hardening plant, 26 x 45 ft. in size, was built of fireproof construction. It is of a steel frame

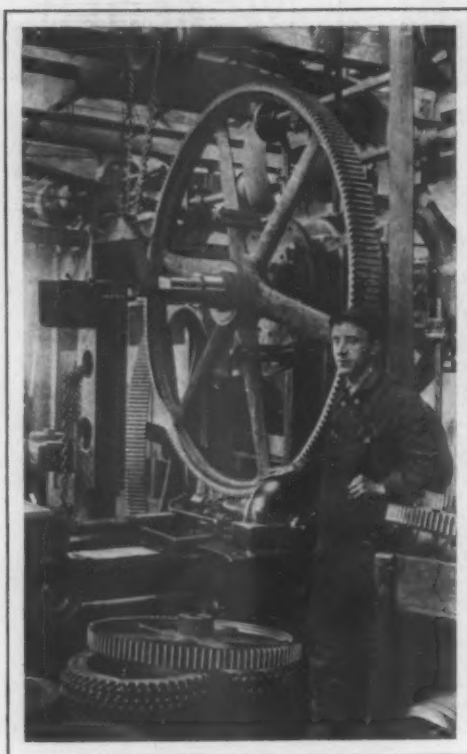
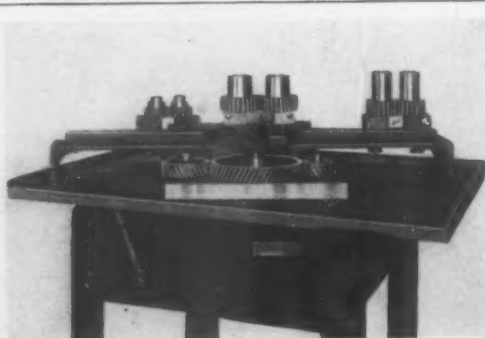
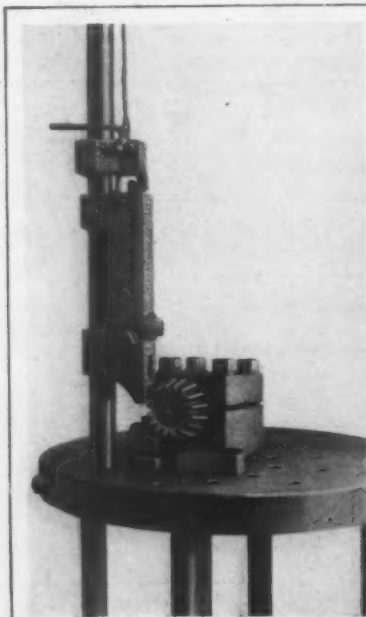


Fig. 8—Cutting Large Diameter Gears

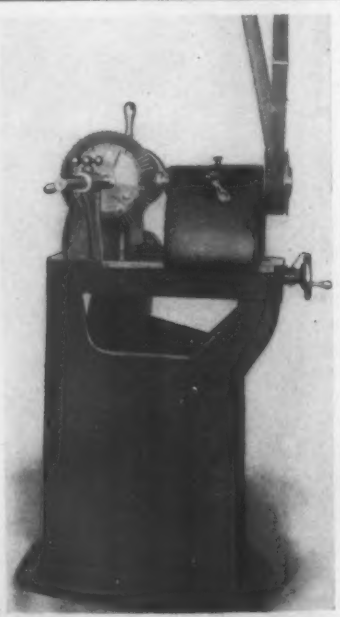
bottom of page 236. It is equipped with machines for testing gears in actual running conditions, as indicated, and also various measuring tools, such as plugs, micrometers and tool vernier calipers. There is a drop hammer machine and a scleroscope for heat treated gears.

The company naturally emphasizes the fact that it has 32 years' experience to call on in manufacturing gears. It lays claim to producing the largest assortment in this country, covering spurs, racks, bevel gears, helical gears and worm and worm gears, which are carried in stock and made not only of steel and cast iron but also of brass. Special gears are made also in a range of sizes from $\frac{1}{4}$ in. to 10 ft. The advent of the automobile has resulted in the company's putting considerable emphasis on automobile developments and transmission gears, as well as the fan, cam, timer and pump gears for the engines. Recently a number of worm and helical gear cutting machines have been developed by the company to manufacture special worm gear combinations to transmit both light and heavy power and it expects soon to manufacture in large quantities worm gears for automobile rear axle drives, both of the straight and Hindley combination. In fact Mr. Burgess presented a compre-



THE INSPECTION DEPARTMENT

The lower cut is a view in the inspection department. The other pictures show machines for testing gears, that to the left being a drop hammer machine and the others being machines for testing the gears under a running condition.



covered with asbestos protected metal. The plant is equipped with two modern brick coal carbonizing furnaces and two of the American Gas Company's furnaces, the latter being equipped for burning fuel oil. There are also lead reheating and oil tempering furnaces using fuel oil. Temperatures are recorded by a Bristol pyrometer and the latest methods for treating steel are studied.

A view in the inspection department is shown at the



hensive paper on the subject before the recent Detroit meeting of the Society of Automobile Engineers, in which it was explained that a combination like that shown at the head of this article, for example, representing a Hindley worm gear and conical spiral worm, has 7 and 25 teeth respectively of $\frac{3}{4}$ in. pitch providing for a

speed reduction of $3 \frac{4}{7}$ to 1 for a gasoline pleasure car of 40 hp. capacity. It is possible that copies of this paper may be had by addressing Mr. Burgess.

Improved CO₂ Meters

Several novel improvements have been recently made by the Uehling Instrument Company, Passaic, N. J., in its carbon dioxide machines and waste meters which in their original form were illustrated in *The Iron Age* June 29,

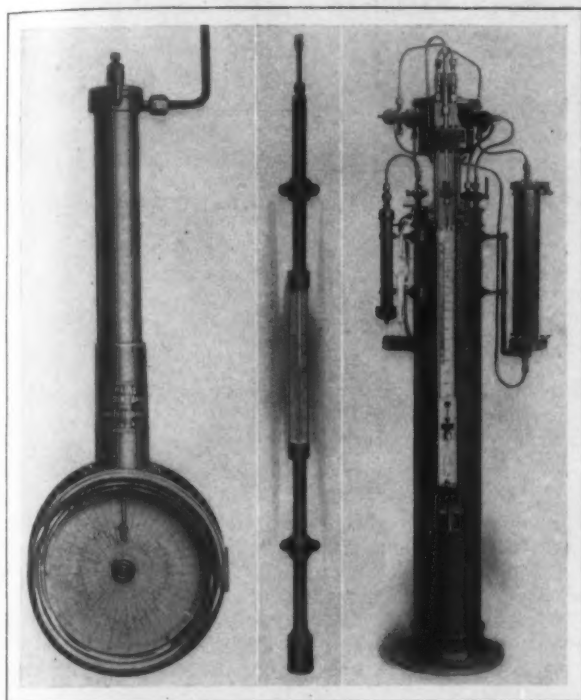
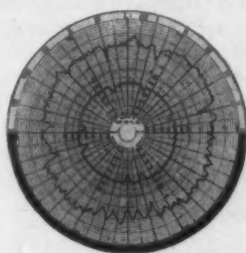


Fig. 1—The Various Types of CO₂ Indicator and a Typical Chart from the New Combined



CO₂ and Temperature Recorder Built by the Uehling Instrument Company, Passaic, N. J.

1911. Formerly the recorder made use of a caustic solution for measuring the amount of carbon dioxide, and the chief trouble encountered with these instruments was said to center around the necessity for renewing the solution and making corrections for errors due to its evaporation or changes in temperature. While the use of any absorbent for the carbon dioxide other than a liquid would be impossible where the volumetric displacement of the caustic solution enters the measurement of the volume of the gases the Uehling instrument operates by a measurement of drop in pressure between two orifices where the dioxide is removed. The principle of operation enables a dry absorbent to be used, and for some time past investigations have been made in the company's laboratory covering tests of different types of dry absorbent cartons with special reference to their adaptability for simple renewal and effectiveness under different operating conditions. This work was completed some time ago, and since then all the machines of this company have been furnished with the dry absorber, while at the same time practically all of the earlier machines in operation have been remodeled. The various types of meters, together with a chart from a new combined carbon dioxide and temperature recorder, are illustrated in Fig. 1, and the interior of a boiler plant in which these recorders are installed is shown in Fig. 2.

The cartons containing the dry absorbent resemble dry batteries in appearance, being about 3 in. in diameter and 18 in. long. The absorbent is a specially manufactured flaky substance, named natron, which is carefully packed in layers within the carton, the whole being incased in wax press board. In use the carton is placed in the cylindrical chamber at the right of the machine shown at the right in Fig. 1, the operation consisting simply in the removal of a few wing nuts, the taking out of the used carton and the substitution of a fresh one.

In addition to the change in the character of the absorbent used other improvements have been made in these meters in connection with the recording devices. The Uehling equipment consists of a machine in which the carbon dioxide is absorbed and the percentage measured pneumatically by changes in vacuum between two orifices, this vacuum being transferred to recorders or indicators located at any desired point. A new type of recorder which is illustrated in Fig. 1 at the left has been developed for service in connection with carbon dioxide meters or the pneumatic pyrometer which operates on a similar principle to the waste meter that measures both carbon dioxide and temperature. This instrument is simply a light pressure or vacuum recorder for vacuums or pressures or both from 0 to 60 in. of water column. When this recorder is to be used for recording CO₂ the chart is graduated from 0 to 20 per cent. and when supplied for recording temperatures the graduations run up to 1000 deg. or for any other desired range. This recorder supersedes a somewhat larger gauge used in the past but which operates on the same principle, that of a U tube filled with a special oil and requiring no levers, pins, springs or similar devices. In connection with the waste meters, the percentage of carbon dioxide and the temperature may be recorded on separate instruments or on a single newly developed instrument, the temperature and amount of CO₂ being recorded on the same chart in either case. This new instrument is built on the same general lines as the other, but carries two pens and gives a chart such as the one reproduced in Fig. 1.

The installation shown in Fig. 2 is one of the boiler rooms of the Corn Products Refining Company, Edgewater, N. J. Here all of the 24 boilers are equipped with waste meters for measuring the percentage of CO₂ and the temperature of the flue gases. These measurements are made by instruments which can be seen at the left of the



Fig. 2—View of a Boiler Room, Showing the Different Instruments Installed

engraving and recorders giving the charts of the two quantities are installed on each machine in this plant. If desired these charts can also be located in the engine room or the engineer's office, as is the case in other plants.

The Meaning of Memorials.—Under this caption a scholarly and captivating address was delivered by Hon. James T. McCleary, member of Congress from Minnesota from 1893 to 1907, at the unveiling of the National Memorial to Christopher Columbus at Washington, D. C., June 8, 1912. Copies are being distributed in pamphlet form. Mr. McCleary is now secretary of the American Iron and Steel Institute with headquarters at 30 Church street, New York.

The Holt Engine Company, Burlington, N. C., which has completed its plant for the manufacture of the Holt rotary engine, is also in position to manufacture all malleable castings on order and is seeking contracts.

Chicago's population is placed at 2,381,700, according to the biennial school census just completed by the board of education. The figures of the last federal census, taken in 1910, were 2,185,283.

Heavy Duty Cutting-Off Machine

Several Improvements Characterize the Latest Gorton Product

For the past 15 or 18 years the George Gorton Machine Company, Racine, Wis., has been developing and improving its original type of cutting-off machine. The result of this work is the company's No. 2-C or 16-in. machine, one of which was recently furnished to a large mill. Among the special features of this machine are the use of a special type of cutter and containing blade and the securing of a large capacity. Front views of the machine with the drum raised for access to the cutters and with a bar in place on the stock trolley are given in Figs. 1 and 3 respectively and the rear of the machine is illustrated in Fig. 2.

The capacity of this machine is cold rolled open-hearth steel bars 6 in. in diameter having a carbon content of from 0.30 to 0.40 per cent. in 30 sec. and a 12-in. bar in 1 min. The working speed recommended for this machine is 1 min. for 6-in. bars with other sizes in proportion. It is pointed out that it is possible to secure this capacity from the fact that the cutter blade with its drum is driven by a spur gear and the entire line of drive from the motor to the cutters is composed of spur gears which it is emphasized possesses the advantages of economical power consumption, durability, low initial cost and ease of repair. The feed is through a worm and segment of a worm gear, an arrangement which gives a 2 to 1 leverage over the cutters. This it is claimed lessens the strain on the feed works and gives a more powerful and steady drive and it is emphasized that when operating at a maximum capacity there is no chatter or vibration in any portion of the machine.

As will be noticed from Fig. 1 the cutter opening is of large diameter and the system of cutters and the blades containing them is a special development of the builder. It is claimed for the type of construction employed that the cutters can be broken without any damage to the containing blade, but care is taken to guard against accidental breakage and loss of cutters by providing the main clutch with a shearing pin which will release the driving mechanism and prevent breakage of the cutters when undue strain is placed upon them. This shearing pin is so located that it only has the momentum of the main driving pinion shaft to overcome and the breaking of it disconnects all parts having a large diameter which continue to revolve until the motor is stopped. In this way it is emphasized all flywheel effect tending to continue the rotation of the cutters is done away with.

The machine is driven by a 40-hp. adjustable speed motor operating at from 300 to 900 r.p.m. which transmits its

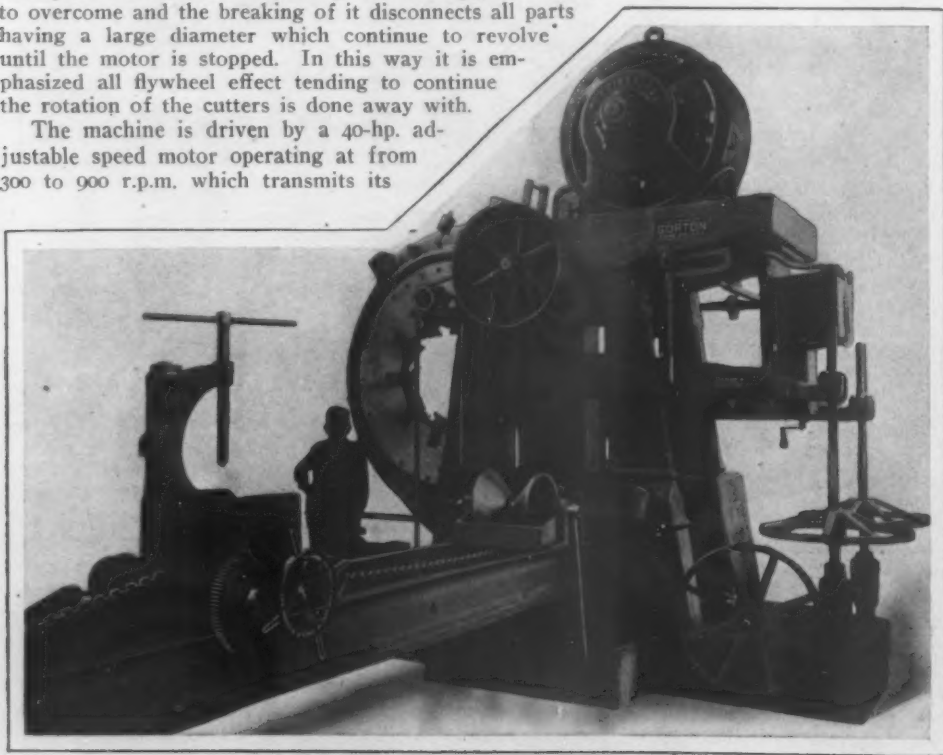


Fig. 1—Front View Showing the Drum Raised for Access to the Cutters of the No. 2-C 16-In. Cutting-off Machine Built by the George Gorton Machine Company, Racine, Wis.

power to the outside clutch gear shown in Fig. 2, through an intermediate gear. This clutch gear is 36 in. across the pitch line. The main driving gear has a pitch diameter

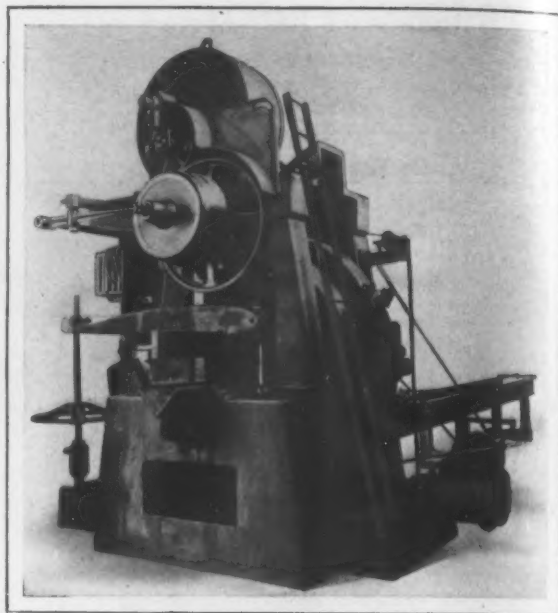


Fig. 2—Rear View of the Machine

of 72 in. and a $4\frac{1}{2}$ -in. face. It is made of semi-steel and meshes with the main driving pinion which is a crucible steel forging made integral with its shaft. The pitch diameter of this pinion is 5 in. and as the cutter points are 10 in. from the center of rotation of the saw drum, it is pointed out that a powerful drive is secured. The main pinion bearings which are $3\frac{1}{2}$ in. in diameter rotate in an oil bath. The feed gears are totally immersed in oil and the main driving clutch is partially covered. To stop the cutters it is not necessary to stop the motor, the main clutch being simply thrown in and out of engagement. The cutters are made of $\frac{3}{4}$ x 3 in. high speed steel and are mounted in a $\frac{3}{4}$ -in. steel cutter blade. The speed of the cutters varies from 17 to 51 ft. per minute, a range which it has been found is adaptable for all grades of stock from the extremely hard to the medium soft.

In operation the stock is fed through the machine continuously by the stock carriage shown in Fig. 3. It can be measured off accurately by a measuring bolt in the same way as is done in the builder's 6-in. machine which was illustrated in *The Iron Age*, September 30, 1909. The clamping devices which are powerful are operated either by hand, pneumatically or by an hydraulic cylinder, the operation being clearly brought out in the accompanying engravings.

In the design of this new machine the oiling features have received particular attention. The saw drum bearings are flooded with oil and their construction is such that it is said to be impossible for lubricating compound, chips or dirt to enter them. In service this type of bearing is claimed to have been very satis-

factory, many of the bearings having been in service for 8 and 10 hr. per day continuously for several years. A pump is provided to supply lubricating compound to the

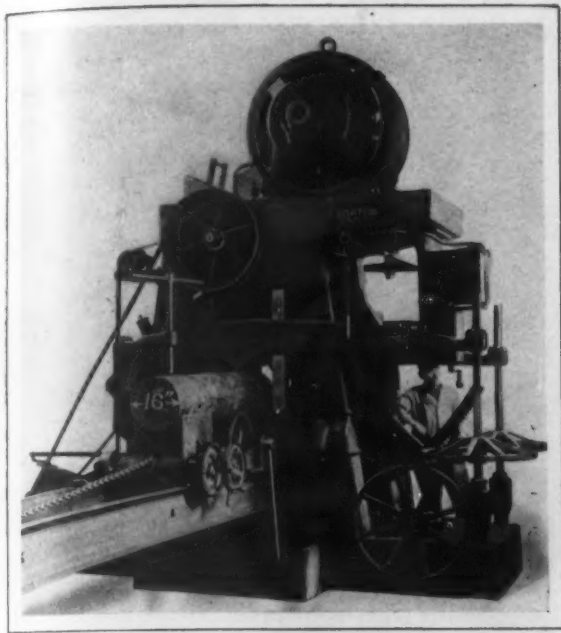


Fig. 3—Front View with Bar in Place on the Stock Trolley Ready to Be Cut Off

cutters when they are in operation. This pump is capable of being operated at any one of seven speeds, this range being available by the use of a cone pulley.

The base of the machine is a heavy rugged casting weighing 14,000 lb. and forming a large pan that contains the cutter lubricant and into which the chips drop. The total net weight of the machine exclusive of the stock rack is 55,000 lb. and the over-all heights with and without the driving motor are 12 and 9½ ft. respectively. The floor space required measures 7 x 9½ ft.

The Tin Deposits in Alaska

Frank L. Hess, of the United States Geological Survey, reports that of the various tin placers discovered in Alaska none have shown much importance except those of Buck Creek on the Seward Peninsula. In the gravel of the creek bed the content of stream tin carrying about 65 per cent. metallic tin has been found to be as high as 400 lb. per cu. yd. in rich spots, though the average is under 30 lb. In figures furnished the Geological Survey, the gold in the gravels has been estimated at 40 cents per cu. yd., at \$60 per ton of stream tin, and at other amounts. Nuggets of gold valued at \$20 or more have been found.

When compared with the Australian and Malayan gravels, where the "black tin" content is in many places from 1½ to 5 lb. per cu. yd., the gravels of Buck Creek appear very rich, but the climate makes the conditions hard for placer working. The season is short, little or nothing can be done before June 15, and the freeze-up is apt to come by September 15. There are many storms, with cold, heavy rains, but, on the other hand, the country is very healthful. A dredge working in this district last year from September 10 to October 15 saved 92 tons of stream tin averaging 66 per cent. tin, or an equivalent of 101 tons carrying 60 per cent. tin. It was sold for \$52,000.

Correction.—In the issue of *The Iron Age* of July 11 an item was published stating that the American Steam Pump Company, Saginaw, Mich., had been incorporated. The name should have been American Steam Truck Company, articles for the incorporation of which were filed in the Michigan Department of State, with a capital stock of \$500,000, and R. T. Armstrong of Detroit named as one of the principal stockholders. The American Steam Pump Company, Battle Creek, Mich., has been much annoyed by the publication of the error.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., states that it has no definite plans for any improvements at present. A report has been circulated that it proposes to make a large extension.

Centrifugal Sump Pump

For draining basements, handling domestic sewage, pumping out bilges, etc., where the liquid collects in a sump, a new centrifugal sump pump of the automatically controlled type has been developed by the Goulds Mfg. Company, Seneca Falls, N. Y. The standard form of pump has an electric motor drive, although where current is not available a belt connection from a gasoline engine or other source of power can be employed. Both styles of pump are shown in the accompanying engraving, Fig. 1 being a view of the motor-driven outfit, while the pump arranged for a belt connection is illustrated in Fig. 2.

The motor-driven outfit shown in Fig. 1 consists of a vertical electric motor, directly connected to a single side suction pump, which is connected by a rigid pipe column to a cast-iron disk cover. This arrangement enables the cover to be used as a support for the motor pedestals, while as the shaft is inclosed by the column connecting the pump to the cover plate it is thus protected from the liquid in the pit. Facilities for inspecting the stuffing box are afforded by a cover plate on the flange which connects the pump and the supporting column.

The operation of the electric motor is entirely automatic, being controlled by a starting device which is actu-

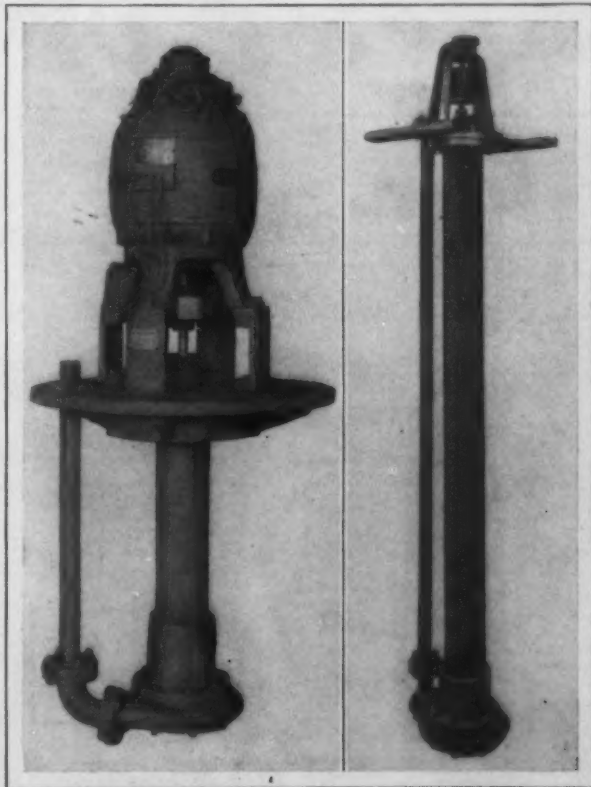


Fig. 1—Motor Driven

Fig. 2—Belt Driven

Two Types of a New Centrifugal Sump Pump Built by the Goulds Mfg. Company, Seneca Falls, N. Y.

ated by a float in the sump. When the liquid rises to a certain predetermined level the float is lifted sufficiently to close the connection between the supply line and the motor armature and the pump is started. As the liquid is ejected from the pit the float falls in unison with the lowering water level until, when the sump is nearly empty, the float has reached a position where the switch is opened, thus interrupting the current supply and stopping the motor.

For service where electric current is not available a pump with a pulley for a belt connection, as illustrated in Fig. 2, has been developed. This pump can be run from a gasoline engine or any other available source of power.

The Van Dorn & Dutton Company, Cleveland, Ohio, reports a very active demand for its line of portable electric tools. In the first three weeks of July its orders in this department exceeded those taken in any previous month in its history. The company is also very busy in its gear department.

Multiple Keyshaft Grinding Machine

Details of a Recent Product of the Bath Grinder Company

For simultaneously grinding with a formed wheel, the side of two keys and the radius between an integral multiple keyshaft or a sliding gear shaft for an automobile transmission case, the Bath Grinder Company, Fitchburg, Mass., has brought out a new multiple keyshaft grinding machine. The special features characterizing the machine are the use of liberal bearings, massive proportions where great strength is required and a centralized location of the various operating levers. The general construction of the machine is clearly brought out in the accompanying engravings, Figs. 1 and 2 being front and side views of the machine, while Fig. 3 is a partial front view with the work in place and the wheel acting upon it. In this engraving the water guard has been removed so as to show the fixtures in detail. The equipment of the machine includes a wheel truing device, which is shown in Fig. 4.

The vertical column has two wide bearings to which the grinding wheel head is gibbed. Internal ribbing reinforces the column which is bolted to the top of the base of the machine, an arrangement that forms a massive and unyielding unit. Rigid construction characterizes the grinding wheel head. Hardened and ground tool steel is employed for the wheel spindle which runs in adjustable phosphor bronze bearings that are protected from grit and are lubricated by a special system. A hand wheel graduated to read to 0.00025 in. controls the grinding wheel vertical feed screw. The thrust of the screw is taken by a ball thrust bearing and for convenience in duplicating work

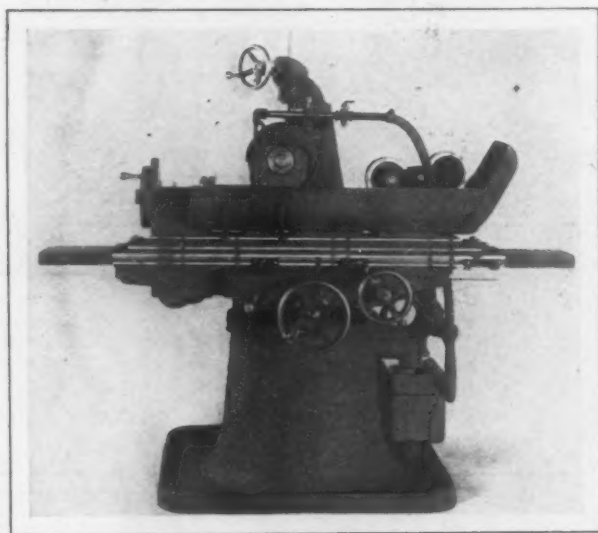


Fig. 1—Front View of a New Multiple Keyshaft Grinding Machine Built by the Bath Grinder Company, Fitchburg, Mass.

a stop is furnished which trips the feed when the desired amount of stock has been removed.

The indexing work head is of the semi-automatic type and is firmly bolted to the table. The mechanism consists of an index dial, a ratchet wheel and an index plunger bolt, all of which are protected from water and grit. A slight backward movement of the indexing handle releases the plunger bolt automatically while movement in the opposite direction causes the work to revolve and the plunger bolt to be engaged in the next tapered notch. The number of divisions of the dial is determined by the number of keys to be ground on the shaft and the mechanism is so designed that the dial cannot revolve backward when the plunger is not engaged, an arrangement which it is pointed insures positive indexing. The construction of the footstock is compact and rigid and the grinding wheel can pass over or by the footstock without disturbing the setting of the grinding wheel. This is made possible by having the center carrier flat and set into the base at an angle which brings the center within $\frac{1}{2}$ in. of the top and also of the inner side of the footstock. The center carrier is operated by a spring controlled by the lever shown at the right end

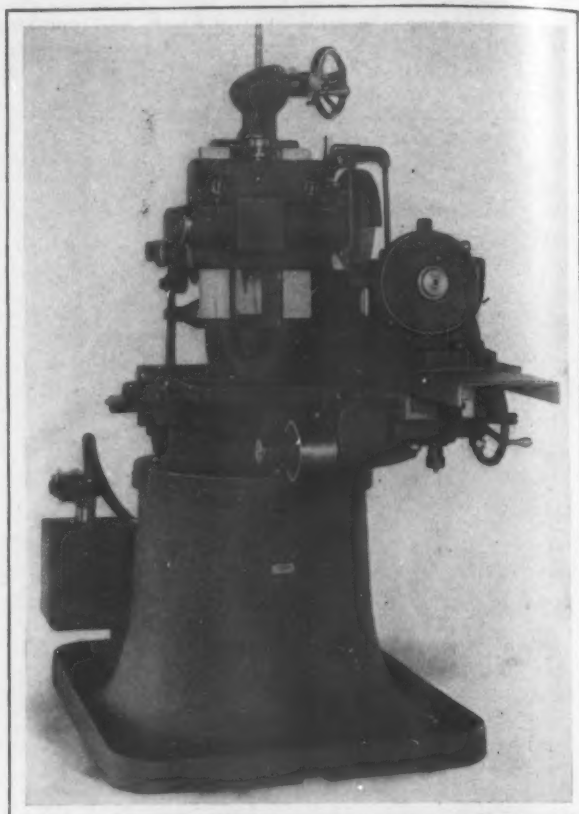


Fig. 2—Side View of the Machine

of the footstock and it can be locked firmly into position by the handle shown at the opposite end. All the operating parts are protected from water and grit.

Two types of control are available for reversing the movement of the table. Adjustable dogs operating against the reversing lever actuate a clutch of the load and fire type to give an automatic reversal of the table while hand control is provided by a conveniently located hand reversing lever. This lever in common with all the other operating levers, handles and adjustments, is located within easy reach of the operator from the front of the machine. If desired the table can be stopped automatically at the end of its traverse by giving the reversing lever a slight turn at any time the table is in motion.

Two attachments are furnished with the machine, a wheel truing device with a master block and a combination centering and rest base. The former of these which is shown in Fig. 4 with the master block in place has three black diamonds, one of which is used for forming the radius of the wheel and is operated by a short lever shown at the end of the fixture, the other two diamonds being

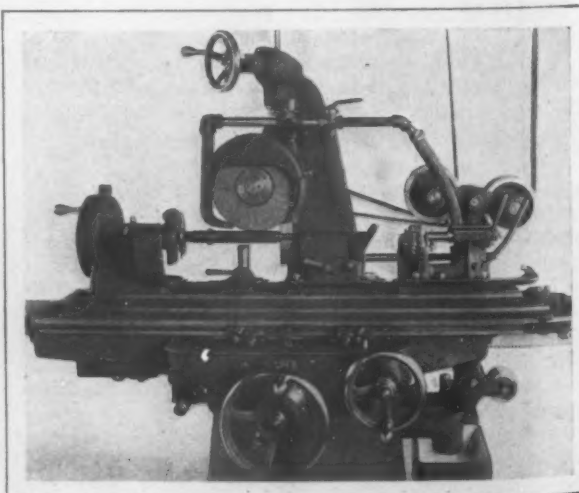


Fig. 3—A Partial View of the Front of the Machine with the Water Guards Removed

used for forming the side of the wheel and operated simultaneously by the long lever at the end of the fixture also. The first diamond is carried by a steel spindle which

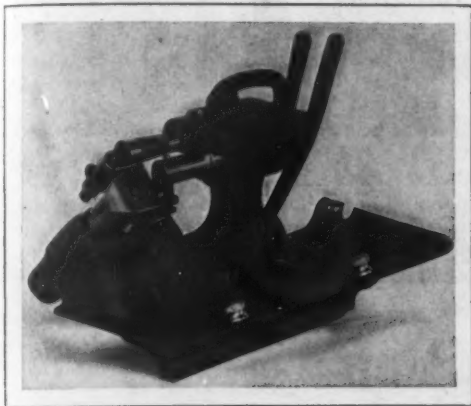


Fig. 4—The Wheel Truing Device with the Master Block in Place

revolves in a tapered bearing and has a very sensitive adjustment. Adjustable tapered keys control the alignment of the side forming diamonds. The master block which is employed for setting the diamonds in the proper position is clamped on the top of the wheel truing device base. This base has a dovetail to insure the correct alignment. The diamonds in this device are set to a hardened tool steel plug carried by the master block and a shield is furnished to cover the bearing of the wheel truing device when the master block is not in use. The design of this device is such that when it is properly located back of the footstock it will not be necessary to disturb it. When a grinding wheel is being trued, the table is moved to bring the center of the grinding wheel over the center of the diamonds, the table having a twin stop for locating the correct position.

For centering work rapidly and acting as a support for slender work a combination centering and rest base is furnished. This fixture is clamped to the table and has a plunger, the top of which is formed to fit between the two keys of the shaft being ground. This plunger is spring actuated and is controlled by a lever which has a cam cast integral with it and engaging the plunger. By giving this lever a slight turn to the left the plunger is relieved from the shaft, or when the base is being used as a support for the shaft the plunger can be clamped firmly in position by moving the lever in the opposite direction.

To assist in the process of grinding, water is supplied from a tank. This tank is separate from the machine which makes it readily cleaned and the pump used in connection with it requires no priming or packing. To prevent the water from splashing on the floor a set of guards is provided which is shown in place in Fig. 1, and removed in Fig. 3.

Banking Blast Furnaces in Elba.—Consul Frank Deedmeyer, Leghorn, Italy, furnishes the following item of information to the Daily Consular Reports: Last year, at the beginning of a strike by employees at the blast furnaces of the Elba Società Anonima di Miniere e de Alti Froni at Portoferraio, on the island of Elba, the furnaces were banked. The fires were covered by a mixture two feet in depth of the finest Elba ore (averaging 52 per cent. iron) and white sand taken from the Mediterranean, in the proportions of 60 per cent. of ore and 40 per cent. of sand. The furnaces were closed and kept air tight. At the end of six months the tuyeres were opened, the hard-baked crust, formed by a fusion of the ore and sand, was broken with sledges and bars, and the fires burned as though there had been no banking of the furnaces.

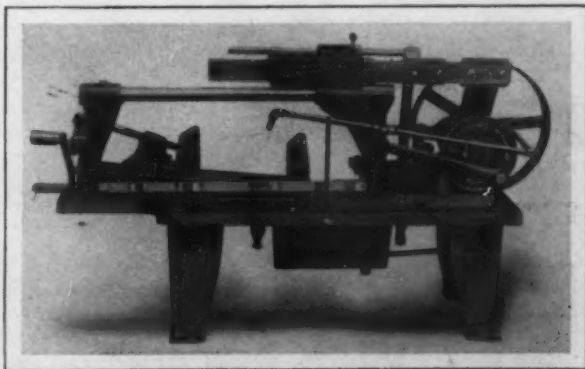
The officers and employees of the Wiley & Russell Mfg. Company and the Wells Brothers Company, Greenfield, Mass., are to have a field day and picnic at Island Park, Brattleboro, Saturday, August 3. This will be the first occasion of its kind and it is intended to make it an annual affair.

New Economy Hack Saw Machine

For cutting all kinds of structural material and solid stock, both rounds and squares, up to a maximum capacity of 8 x 15 in., the W. Robertson Machine & Foundry Company, 32 Greenwood place, Buffalo, N. Y., has added a new hack saw machine to its line. This new machine is known as the Economy No. 5 power hack saw machine and in a number of respects resembles the No. 2 type, which was illustrated in *The Iron Age* May 30, 1912. One of the special features of the machine is the adjustable saw frame, which enables a 10-in. blade to be employed for cutting small stock and is an advantage when large stock is not being cut continuously.

The saw cuts on the draw stroke and is raised on the return, thus giving practically double service from the blade. When the cut is completed the saw stops automatically. The crankshaft runs in a 6-in. bearing machined from the solid metal. A friction band clutch formed in the driving gear is mounted on this shaft, the gear being driven from the pulley pinion at a speed of 70 r.p.m.

The vise is another novel feature, having a quick adjustment for large or small stock, which enables the operator to open or close it instantaneously through a range of from 1 to 15 in. It swivels to a maximum angle of 45 deg., the exact amount being indicated by a series of graduations. The bed is a one-piece box casting with all surfaces milled true and parallel, and the head is



The No. 5 Economy Hack Saw Machine Built by the W. Robertson Machine & Foundry Company, Buffalo, N. Y.

milled to fit in housings on the bed. The frame is supported on a finished steel arm having a long milled bearing. It is mounted in the center of the support and the drive is from the center of the frame to the crankpin.

The following table gives the principal dimensions and specifications of the machine:

Capacity of machine, in.....	8 x 15
Minimum length of blade, in.....	10
Maximum length of blade, in.....	24
Length of stroke, in.....	6
Diameter of driving pulley, in.....	15
Face width of driving pulley, in.....	2 3/4
Speed of driving pulley, r.p.m.....	140
Net weight, lb.....	360
Foreign shipping weight, lb.....	400
Contents of case, cu. ft.....	12

The tank shown under the bed is for liquid, which is pumped to the saw blade by a rotary brass pump connected to the driving gear at the rear of the head. This liquid as it falls from the blade returns to the tank and is used over and over again.

The Vulcan Engineering Sales Company, Fisher Building, Chicago, announces that it has taken the selling agency for the line of structural and plate working machinery (punches, shears, rolls, bulldozers, etc.), manufactured by the Rock River Machine Company, Janesville, Wis. This is in addition to the lines previously controlled, which include the product of the Hanna molding machine works, making pneumatic riveters; Mumford Molding Machine Company, molding machines and foundry equipment; Q M S Company, metal sawing machinery and shop equipment. The Vulcan Engineering Sales Company makes a specialty of machinery for structural and boiler shops and foundries.

Phenomena in Rolling Fresh Steel Ingots

The Swelling and Bursting of Billets Rolled from Ingots Only a Short Time in the Soaking Pits

In *Stahl und Eisen*, March 7, 1912, Karl Neu, steel works superintendent, Neunkirchen, contributed an interesting article with phenomena observed with ingots that were all, partly unintentionally and partly with intention, rolled after being in the soaking pits for an unusually short time. The first case was observed as far back as 1907. A rail ingot weighing about 4000 lb. that was top poured in the usual way was rolled after being in a furnace for 17 min. to billets 6.7 x 8.3 in. (170 x 210 mm). After the first pass it was noticed that the ingot expanded in the center. In order to investigate this a piece was sheared at the expanded part, polished and etched with copper-ammonium-chloride. The result is shown diagrammatically in Fig. 1. Drillings were taken at the place marked S, M and K, which gave the very remarkable results shown in Table 1, directly opposed to those usually obtained. In order to be sure that no mistake had been made either in the sampling or in the laboratory, further drillings were taken from S and K, the results being shown in the lower part of Table 1. A third test from K gave 0.07 per cent. carbon, so that the first results obtained are confirmed.

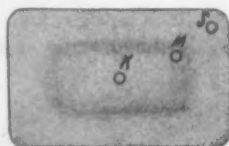


Fig. 1—Etched Surface

Table 1—Drillings from Expanded Portion of Billet.

Test	C per cent.	S per cent.	P per cent.	Mn per cent.
S	0.38	0.107	0.045	0.80
M	0.25	.....	.....	.....
K	0.09	0.018	0.045	0.80
S	0.30	0.066	0.110	0.80
K	0.10	0.015	0.035	0.78

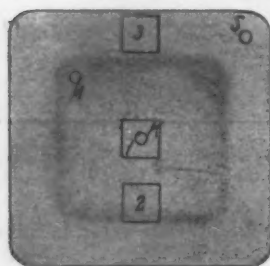


Fig. 2—Etched Surface Showing Location of Samples

Table 2—Drillings from Billet a Longer Time in Soaking Pit

Test	C per cent.	S per cent.	P per cent.	Mn per cent.
S	0.30	0.079	0.110	0.80
M	0.26	.....	.....	.....
K	0.13	0.023	0.050	0.76
S	0.28	0.080	0.100	0.80
K	0.14	0.018	0.045	0.78

After a long time, during which the same appearances were noted many times, tests were made to determine whether they could also be observed with low carbon material. The following case may be taken of an ingot weighing 6180 lb. rolled after being in the soaking pit for half an hour to 3.15 x 3.15-in. billets. A billet was sheared, polished and etched giving an appearance shown in Fig. 2. Drillings were taken from the positions marked S, M and K, the results being shown in Table 3. To confirm these results test pieces were machined from another billet from the positions marked 1, 2 and 3, and the results, which agree with the analyses, are also shown in Table 3.

Table 3—Drillings from Billet of Low Carbon Steel

Test	C per cent.	S per cent.	P per cent.	Mn per cent.	Ultimate stress lb. sq. in.	Elong. per cent. 3.9 in.	Redn. area per cent.
S ..	0.05	0.050	0.060	0.42	.....	.....	.....
M ..	0.10	0.120	0.105	0.46	.....	.....	.....
K ..	0.03	0.025	0.035	0.39	.....	.....	.....
1 ..	.....	.....	.....	.....	49,070	36.0	60.8
2 ..	.....	.....	.....	.....	59,310	28.0	26.3
3 ..	.....	.....	.....	.....	50,350	38.0	61.6

A further test was made with a fairly high silicon 2-ton rail steel ingot, rolled to 6.7 x 8.3-in. billets. After casting, the steel was only 11 minutes in the mold, and then, intentionally, only allowed to stand for 15 minutes in the soaking pit. In this case also, as in the others, the ingot expanded during the rolling. A section was cut from the billet, and drillings taken in the positions shown in Fig. 3. The results are given in Table 4.

Table 4—Drillings from Practically Fresh Cast Rail Ingot

Test	C	S per cent.	P per cent.	Mn per cent.
0	0.09	0.027	0.035	0.96
1	0.16	0.020	0.030	0.88
2	0.26	0.041	0.035	0.98
3	0.38	0.127	0.075	1.06
4	0.34	0.085	0.065	0.98
5	0.36	0.081	0.040	1.00

After a few days a similar test was made with an ingot that not only expanded but burst at the third pass. A section was cut at the burst place, and the drillings taken according to Fig. 3. The results were as given in Table 5.

Table 5—Drillings from Ingot That Burst on Third Pass

Test	C per cent.	P per cent.	Mn per cent.
1	0.067	0.030	0.92
5	0.428	0.090	0.89

The explanation for this most peculiar phenomenon, which is clearly observed in every case, is most probably that the steel is rolled while the interior is still liquid. Under the strong pressure this liquid metal will be pressed against the frozen but still doughy exterior, and if this is not strong enough is pressed through it. This explanation would appear certain if it were not for the fact that the carbon is always lowest at the center, and concerning this point some one or other of the technical colleges may be able to give logical reasons. The results as a whole show clearly the danger of drawing and rolling steel before it is thoroughly set. G. B. W.

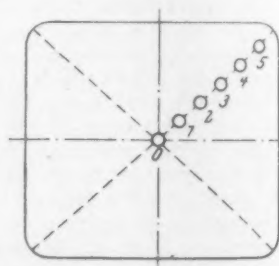


Fig. 3—Section of Billet Showing Drill Holes

Spelter Production in 1911

Figures compiled by C. E. Siebenthal of the United States Geological Survey from reports by all zinc smelters operating during the first six months of 1912 and from the records of the Bureau of Statistics show that the production of spelter from domestic ore in that period was 159,952 net tons, and from foreign ore 6544 tons, a total production of 166,496 tons of primary spelter, compared with 140,196 tons for the first half of 1911, and with 146,330 tons for the last half of 1911. This production for the first half of 1912 is at the rate of over 330,000 tons a year, being more than double the production of any year prior to 1904 and approximately 46,000 tons greater than the production in 1911. The apparent consumption for the period was 159,046 net tons, as compared with 145,157 tons for the last half of 1911 and 134,902 tons for the first half of 1911. The stock of spelter held at smelters on June 30, 1912, was 6414 tons, as against 9081 tons at the beginning of the year. This stock of spelter is in part made up of the ordinary working stocks at smelters, but also includes stocks of special grades of metal held for particular demands. The stocks are now smaller than at the close of any year since 1906.

The New Port Henry Blast Furnace

New Stack of the Northern Iron Company the Lower Part of Which Is of the Thin-Lined Construction

BY FRANK C. ROBERTS

The Northern Iron Company, Port Henry, N. Y., has under construction a new blast furnace which embodies several departures from the generally accepted ideas of furnace construction. The furnace is, however, not an experimental design, the company having demonstrated its advantages in two furnaces constructed along similar lines, one at Port Henry, now being replaced by the furnace herein described, and the other at Standish, N. Y. The departure in principle present in this design is due, so far as the writer is aware, to F. E. Bachman, who was for several years the manager for the Northern Iron Company.

From an examination of the accompanying sectional drawing of the furnace it will be noted that from a point 18 ft. 6 in. above the bosh line downward the design is that of a thin-lined furnace, whereas from the same point upward the construction is of the familiar type. It would appear wise to consider in these days of thin-lined furnaces whether it is not more advantageous to use a thin lining for the working portion of the furnace and the thick lining for the upper portion of the furnace where the stock is in course of preparation. It is undoubtedly desirable from the standpoint of economy to retain heat within the furnace and it is not unreasonable to question the value of carrying the thin lining and water cooling as high as the stock line.

As before stated, the new furnace is built to replace an old furnace which had been remodeled to embody, as far as possible, the ideas of construction which are more fully carried out in the furnace herein described. The existing stove and power equipment will be utilized.

The furnace columns are constructed of wrought steel enclosed up to tuyere level with cast-iron casings filled with concrete. The top of each column carries a steel slab, which in turn supports the mantel. From the mantel upward a wrought-steel shell is provided, from which the hopper is supported by brackets. The shell enclosing the thin portion of the inwall is made of wrought steel.

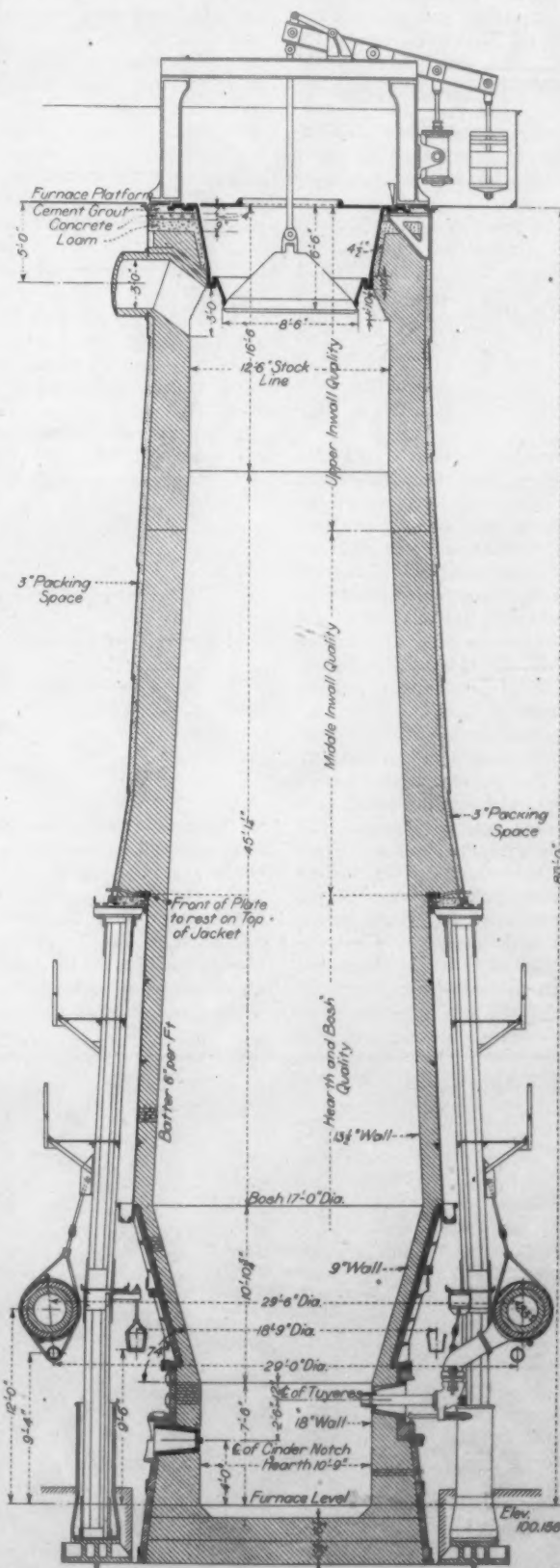
It is riveted to the mantel and extends downward to a point slightly below the bosh line, where a water trough is riveted thereto.

The bosh jacket, tuyere jacket and hearth jacket are constructed of heavy cast-iron sections containing extra heavy coil pipes; the various sections are secured in position by heavy links and bands. No connection is provided between the furnace shell and the top of the bosh jacket, provision being made by means of caulking strips for a tight, sliding fit.

The furnace is equipped with 12 tuyeres and one cinder notch. Platforms supported by the furnace columns provide access to the furnace shell below the mantel.

No water cooling is provided above the mantel, but in order to protect the inside of the mantel, cast-iron water-cooled plates are installed. Water sprays are provided for cooling the furnace between the mantel and the top of the bosh jacket.

The bosh jacket is made in 18 sections, each section having a separate water connection to its coils. This arrangement is provided to control the accumulation of dirt and kish on the bosh walls and has proved very desirable and effective. If, on restricting the water supply to any one section, the discharge water does not rapidly increase in temperature, it is evident that the bosh wall opposite the section in question is well covered with accumulations of dirt and kish. Such being the case, the continued restriction or the closing of the water supply to the section soon results in the scouring and cleansing of the bosh wall. The tuyere and hearth jackets are cooled by the circulation of water through their coil pipes. The downcomer is connected to the furnace top by four equally spaced branches, each branch being well above the stock line. Two Roberts relief valves are provided. The furnace is furnished with a barrow filling equipment and it will probably be completed in the early autumn. The work is being built under the design and supervision of Frank C. Roberts & Co., Philadelphia, Pa.



Section of the New Port Henry Furnace.

The Junkers Oil Engine

Valveless Engine with Two Pistons Per Cylinder for Utilizing Cheapest Grades of Fuel

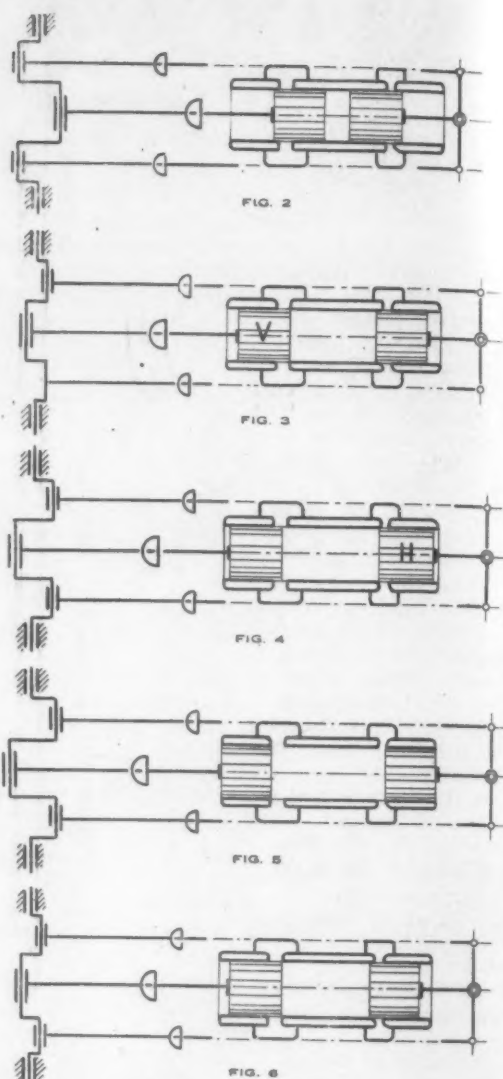
BY JOSEPH B. BAKER

The Junkers oil engine is an internal combustion engine in which the cylinder is a simple tube open at both ends without stuffing-boxes or valves on the cylinder. The ignition is obtained as in the Diesel engine by the heat of compression in the cylinder charge of air into which the fuel is sprayed. The pistons, two in number in the single cylinder engine, alternately recede from and advance toward each other. It is an engine which consumes the cheapest grades of oil that will burn, down even to the asphaltum oils and their residues. Finally, with such almost absurdly simple design involving low cost of construction and operating on such low grade fuels, this engine shows, it is believed, higher economy than all other heat motors, and it has singular adaptability to marine propulsion and to locomotives.

For the purpose of defining the position of the Junkers engine in the field of internal combustion engines, the well-known fact is worth reiterating that just as Watt is responsible for the steam engine, which has developed into many types, so Dr. Diesel is originally responsible for the oil engines of compression-ignition type in all their different forms. The most advanced and the most distinct of these is the result of years of patient, painstaking work by Professor Junkers, the distinguished mechanical engineer of Aachen, Germany.

Internal combustion engines burning cheap fuel oils have been developed for stationary work, but have been found less readily available for other applications largely on account of their great weight, their lack of overload capacity, and their lower efficiency when underloaded and inability to operate over a wide range of speed. The radical improvements in design in this new engine seem to make up these shortcomings by the very boldness of the new departures which give the engine its high efficiency of transformation of heat into work, as a brief description of the construction and operation of the simplest form—a single cylinder engine—will show.

Fig. 1, Figs. 2 to 6, and Fig. 7 are respectively a general view of a recent type of Junkers oil engine, five diagrams tracing the operation of the single cylinder engine through one complete revolution, and an indicator card tracing the cylinder events through one revolution. The engine operates on the two-cycle principle, that is, every other stroke in each cylinder is a working stroke, the alternate ones being compression strokes. It will be seen that the two pistons of the engine work on cranks at 180 deg.—two side cranks connected to linkage which is actuated by the right hand piston, marked H in the diagrams, and a center crank connected to the left hand piston V. (The two side cranks appear near the top of their throw



Diagrams Showing Cylinder Events

in the general view Fig. 1.) It is obvious that the alternate out and in movement of the pistons turns the main shaft.

In the first diagram, Fig. 2, the engine is at its inner dead center, and the combustion space between the two pistons is filled with highly compressed, highly heated air. In this position the oil fuel is sprayed in, igniting and burning under constant pressure as the outstroke begins (A to B on the indicator card). Assuming the supply of fuel

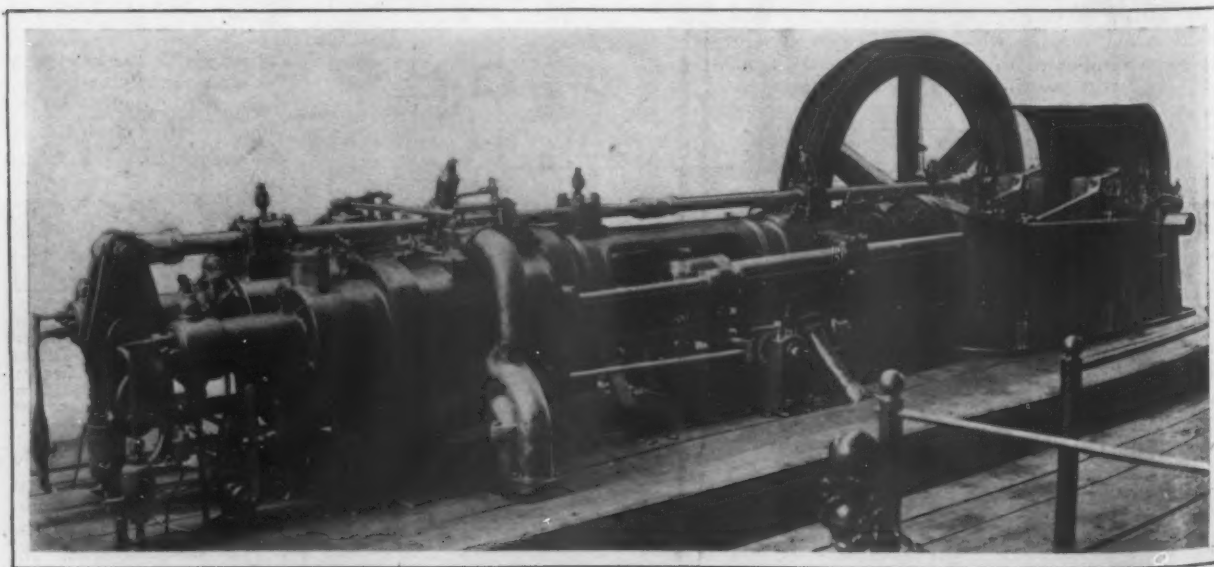


Fig. 1—A 250-hp Tandem Junkers Oil Engine

cut off at B, the working stroke continues with expansion from B to C, bringing the pistons to the position of Fig. 3. At this position, which is the outer dead center, piston V is just about to open a ring of exhaust ports near the crank end of the cylinder; and as the out motion of the pistons continues the products of combustion escape at about atmospheric pressure (C to D on the card). When the position of Fig. 4 is reached the exhaust ports are being opened wider by the movement of the piston V, and piston H is just about to open a ring of air ports near the right hand end of the cylinder, allowing fresh air to enter under moderate pressure. The rush of this air thoroughly scavenges the cylinder, sweeping the remnant of burned gases out through the exhaust ports. These conditions are maintained until the pistons pass the outer dead center and begin to return, Fig. 5. In the next position, Fig. 6, the in movement of the pistons has closed both rings of ports and the compression stroke begins on a charge of cool, fresh air. This compression stroke, of which the line F-A on the card is a graphic record, heats the confined air to such a temperature that the fuel, sprayed in to the cylinder in a finely dispersed condition just before the point A is reached, ignites spontaneously. The cycle is then repeated.

The two-cylinder, four-piston form of the Junkers oil engine is an especially interesting design. With the two cylinders arranged in tandem the two inner pistons (one in each cylinder) move together in the same direction, being linked to a single crosshead connected by a pair of rods to the two outside cranks. Since these linked pistons move together, what is a compression stroke for one piston in its cylinder is a working stroke for the other in its cylinder, as inspection of the sketch, Fig. 8, makes clear. In this sketch the crosshead I of the piston rods C and D is connected to the two outside cranks of the engine by the rods K and L. The two outer pistons, which also move together, being linked by crossheads and rods to the center crank at 180 deg., also give a working stroke in the one cylinder simultaneously with a compression stroke in the other. In the actual construction this involves two pair of connecting rods, in the horizontal and vertical planes respectively, and the arrangement makes every stroke of the engine as a whole a working stroke in one cylinder and a compression stroke in the other.

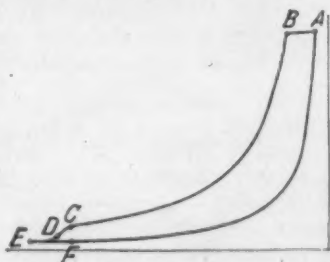


Fig. 7—Typical Indicator Card

Inspection of the diagrams Figs. 2 to 6 shows that scavenging is thorough, and that both the scavenging and the exhaust are accomplished without valves having moving parts, the air and exhaust ports being simple holes, uncovered by the pistons. Auxiliaries, driven from the connecting rod linkages, supply the compressed air for scavenging and for the fuel spray. Another interesting point is that one side of each piston is always exposed to the atmosphere, and that the pistons come to rest at every outward stroke in a thoroughly cooled region of the cylinder, which is not touched by the burning fuel. Thus thorough cooling and easy lubrication are secured. Again owing to the division of the total stroke between two pistons in each cylinder a high aggregate piston speed is attained although the individual piston speeds are low. The design also permits the use of a long cylinder of comparatively small diameter, which is most favorably adapted to thorough scavenging and to perfect combustion.

Actual Junkers units in use or under construction abroad include the propelling equipment for twelve ocean-going ships, stationary engines by prominent European concerns, and a 2000-hp. locomotive designed for a speed of 125 kilometers per hour and weighing less than a steam locomotive.

One of the vessels referred to, a 387-ft. ship, equipped with the new engines, is notable as the first ocean-going British vessel built in a German shipyard. The rivalry on the ocean between the two nations is well known, and this first open acknowledgment by England of the fact that Germany has taken the lead in oil engines for marine propulsion is very significant.

The Junkers engine may be expected to find wide application. It has been amply demonstrated with existing internal combustion engines that any engine room attendant can run this type of prime mover, and the economy in fuel, the ability to burn cheap fuel, and the valveless simplicity of the new engine, as an added advantage to the elimination of ignition mechanism, should aid in introducing it widely. It has been one of our national sins against the conservation of natural resources that economy of fuel consumption for power purposes has not been regarded in this country as it has been abroad, but the growing attention to the conservation of fuels, plus engine room

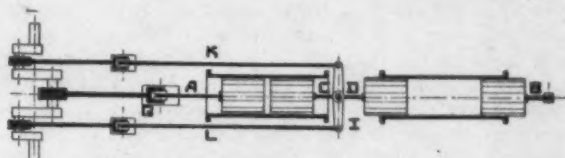


Fig. 8—Two Cycle Tandem Engine to Make Every Stroke a Working Stroke

practicality, will ultimately develop cheap power from oil fuel to an extent comparable to the rapid development of electrical power in the last decade. It is of direct practical interest to note that these Junkers oil engines cost considerably less than a corresponding steam installation. This becomes clear at once from the greatly diminished weight of the Junkers engine.

Adjustable Boring Bar

For forming cylindrical openings or for cutting taper bores of different shapes the Sanderson Tool Sales Company, 438 Brown-Marx Building, Birmingham, Ala., has placed on the market an adjustable portable boring bar. This tool can be applied to a drilling machine, a radial drilling machine, a lathe, a drill driven by either an air or an electric motor or any machine having a revolving element and is said to be readily adjusted, easy to operate, capable of turning out accurate work and simple in construction.

The tool carriage A consists of a rack, a worm and a graduated segment, the last of which is protected against the entrance of chips, grit and dirt. The cutting tool B is inserted at right angles at the bottom of the tool carriage and is driven by the star feed C. The tool enters the tool bar guide D which is dovetailed to prevent the tool bar or rack from vibrating and thus interfering with the perfect finish of the bore. When it is desired to adjust the tool to any point in its range of from 0 to 6 deg., the nuts E, F and G are loosened and the graduated segment H set to the desired degree of the taper. If a straight hole is desired, the nuts are loosened as before and the segment and the tool bar guide are adjusted to the desired diameter which may be anything from 2½ to 5 in. An oblong hole, I, in the driving bar is provided at E and F to take care of any curvature in the slot of the tool bar guide and the graduated segment.

At the present time only one size of bar is made. The overall length of the bar is 32 in. and it will bore straight holes ranging in diameter from 2½ to 5 in. and 8 in. deep. Holes with a taper up to a maximum of 6 deg. can be bored as well as those conforming to a No. 4 Morse standard taper. Although not regularly furnished the company will upon receipt of specifications supply tools for cutting holes that are either deeper or larger or have a more abrupt taper or any combination of the three.



An Adjustable Boring Bar for Straight and Taper Holes, Sold by the Sanderson Tool Sales Company, Birmingham, Ala.

When Modern Machine Tools Fail to Save

With Full Knowledge of Unit Operating Costs High-Powered Factory Equipment Shown Sometimes at a Disadvantage Compared with Ordinary Machinery

BY STERLING H. BUNNELL

It is generally accepted that modern high-powered machine tools are required for economical factory operation. In looking over a shop with a view to purchasing it as a going concern, the manager of experience would consider an outfit of new machinery of modern design as an indication of low cost of operation. However, it is common knowledge that some shops filled with old, light-weight machines are able to undersell concerns with far better equipment, even though the latter are backed by superior management. In the long run of competition, the poor old shop sometimes fails to be killed off and may even grow strong and end by absorbing the large competitor.

Using Machinery for Purposes Not Intended

The reason for such anomalies is not that new equipment is inferior to old, but it lies in the failure to appreciate the true cost of operation. Good equipment, efficiently used, always means lower cost. It is inefficient use of equipment that gives rise to the startling failure of well-fitted shops to make profits. Inefficient use is not always the fault of the management; it often occurs because tools unsuited to the work to be done are found in place by a management that had no hand in their purchase. Good theory gets much blame which should be given to bad practice. Inefficient machinery should be replaced by that which is suitable; yet it is often best to operate whatever is on hand to the best purpose possible, rather than to suffer greater loss by replacing it. If a man starts out to invest a sum of money in a factory suitable for making steam engines, he should pass over any offer of a shop with an equipment unsuitable for the purpose, as, for instance, equipment, however excellent, planned for making sewing machines or automobiles, because such tools would not be suitable for building engines. If, on the other hand, he should come into possession of a shop equipped to make sewing machines, his proper course would be to operate it for the purpose for which it is adapted, and not for any other purpose.

An existing machine equipment should be used for the work for which it is best suited. The equipment as a whole may not be well balanced; there may be a surplus of heavy, light or special tools for the product as a whole, in consequence of which some of them may be over or under worked. The manager's problem then becomes, to use each to its full efficiency as far as possible, and for the remainder of the time, on the most available work which can be given to it, so that it may earn something at least toward the general expense of the shop. The problem is not generally capable of a definite solution; it is mathematically "indeterminate"; and financial success depends upon the judgment used in arriving at the tentative solutions.

The Operating Cost of Each Machine

The known facts of the machine operation problem are the figures of operating cost. Each tool occupies space, requiring heat, light, and perhaps crane service, and it should pay proper rent accordingly. It represents an investment, on which it should pay interest and a sinking-fund charge—depreciation; it must lay up a proper sum to cover repairs and accidents incidental to its use; and it must pay for its power consumption. The tool cannot run itself without direction; hence the wages of the operator and the cost of supervising and maintaining him is a part of the operating cost. All the elements, properly determined, make up a total charge representing the cost of doing work on the tool; and the charge, like the workman's weekly wages, is best divided into an hourly rate, so that the cost of work done by the tool can be determined by measuring the time of operation only.

It is generally impossible to combine wages and burden

charge into a single hourly rate, because wages as well as operators are subject to change, while burden rates are generally constant. It is convenient, however, for purposes of comparison to consider the total cost of operating the tools in the form of single hourly rates, and to study the operating problem accordingly. Obviously the cheapest way to do a given piece of work is by the tool giving the lowest product of hours by tool rate; thus, a job on a 12-in. lathe done in 30 min. at a rate of 50 cents per hour costs less than on a 16-in. lathe in 25 min. at a rate of 66 cents per hour.

While it often is impossible to put work on the smallest machine adapted to it, the fact remains none the less that the use of tools on work which could be done as quickly by others with lower operating cost causes a loss to the factory every time. The time element makes it fair to conclude that between two tools giving the same total cost on a piece of work, that tool which will complete the job in the least number of minutes should take the work; because whatever helps to increase the quantity of work turned out by the shop in a given time is a means toward increasing the rate of earnings. The time element is included in the tool rate by reason of the interest and depreciation charges, so that generally it is right to use those tools which show the least total cost on the jobs under consideration.

Conditions for Using the High Cost Machines

With a factory already equipped, the manager has no opportunity to exercise choice in providing the tools and has only to use what he has given him to the best advantage. Accordingly, he will assign the work to the tools showing the least operating cost, up to the limit of their capacity. There will remain idle time on some few tools, probably those having high hourly rates. If more heavy work can be secured for these, the output will be increased to advantage. If there is no more heavy work, but a surplus of jobs which should properly go to smaller tools, these ought to be put on the idle large machinery, unless the actual extra outlay for labor, power and repairs incidental to operation only, amounts to more than the hourly rate on the proper tools.

To illustrate, suppose there is a 72-in. boring machine with a total hourly rate of 90 cents, of which 50 cents is for wages, power and repair charge; and 42-in. machines with a total hourly rate of 60 cents. Work suitable for the smaller machines would then better be diverted to the 72-in. mill rather than wait indefinitely, because the large mill would earn for the shop 10 cents per hour net above the extra expense incurred by operating it. The foreman, if properly interested in the cost records, will object to using the large tool, because the burden is so high, and resort to every subterfuge to hold the big machine idle and get the work done on some tool with a low hourly rate. Here is where bad theory defeats good practice. Obviously, the large tool is here in the position of the skilled mechanic who in hard times takes a helper's job at half his regular wages rather than let his family go hungry, and hopes to do better as soon as opportunity offers. The large tool should be charged to the job at the rate of the small tool it replaces; and the foreman's instinct will then be justified by the facts of the cost records.

Mere Speed Not the Only Thing Desired

If hourly rates are applied to the problem of selecting new equipment, the element of guesswork is largely removed. The new tool is not yet an existing item in the daily operating scheme, to be used as best may be under the actual conditions. In the vacant space to be filled, there may be placed a small, cheap tool to be operated by

a skilled man, doing work at a fair rate of speed and costing little when idle; or a heavier tool doing quicker work, at a higher hourly rate; or a large, expensive machine, partly automatic, able to do the work of several tools not yet needed, and so likely to stand idle much of the time.

Mere speed in doing work is not the only thing to be desired. Interest charges are important with expensive machines; depreciation should be allowed liberally on ingenious new machines which will soon be surpassed by better, more brilliant designs; and floor space made non-productive by the presence of a large idle tool is an item of possible earning power put temporarily out of use. Very often the manager is carried away by the very ingenuity of a new special tool and buys it in the face of the probability that it will stand idle the greater part of the time, during which intervals the loss by interest and depreciation will absorb more than the profits of the short times of use.

Care to Be Exercised in Selecting Special Machinery

In general, standard, small, low-priced machinery should be considered carefully before deciding on special, large and expensive equipment. Tools purchased should be those best adapted to the majority of the work to be done. Occasional jobs should be planned for handling by makeshift methods if necessary, and not by heavy, expensive machinery until it is certain that the loss by the present methods is considerably greater than the gross cost of operating and maintaining more effective machinery. Too many engine shops have 16-ft. boring machines used to capacity ten days per year, and most inefficiently for most of the remaining time on work suitable for 8-ft. machines at largest. Automatic turret machines are found running under conditions where a skilled operator must be kept employed on work beneath his capacity during long periods when the machines cannot be kept busy. Hand turret lathes run by cheap help will often show a profit under conditions where automatics properly charged with their full cost of operation would show a loss.

Proper View Toward Machine Cost Accounting

It is the instinct of accountants, trained to secure absolute accuracy in their figures, to regard cost-keeping as properly subject to the same degree of precision as the general accounts. Broadly speaking, absolute accuracy in cost-keeping is as misleading as hair lines in plotting engineering observations or long lines of decimal figures in computing engine horsepowers. Cost figures in accurate agreement with general accounts are so often wide of the mark that shop men disregard them habitually as mere theory, knowing from their experience that jobs recorded as costing less than others really took more of the shop's valuable time and space. The effect of the proper selection and use of equipment on the cost of doing work ought to be shown by the cost records, and the advantage would be worth almost any price. Very few shops have however adopted the very obvious suggestion of keeping accounts with each tool or group of similar tools, charging the cost items regularly, and crediting for the value of the actual running time at the rate set. It is not considered a waste of money to keep each worker's account separately, often with the complication of day, piece and premium work; yet the hourly cost of tool operation is generally greater than the wages of the workman, and the tool represents responsibility to capital, while the man's capital value is his own.

The efficiency of the factory equipment in its use is quite as easy to show by cost accounts as the efficiency with which the piece worker uses his time. Even though instinct, judgment or experience may guide the manager in planning his factory work to the best possible result, there can be no certainty without the detailed record of cost and earnings of each item of the factory equipment. The most satisfactory thing in sight in considering the adoption of an effective cost system of this kind is the fact that the essence of the system is to show the exact amount and location of each lost opportunity to earn a dollar. Under such conditions, the cost system would not only return its full cost many times over, but it would prove the fact so as to convince the most skeptical.

Coal Production in 1911

Slightly Below the Half Billion Output in 1910

The final figures of coal production have been compiled by Edward W. Parker and are discussed by him in a statement just issued by the United States Geological Survey. They show a total production in 1911 of 496,188,308 net tons, valued at the mines at \$625,910,113. Of this production anthracite (Pennsylvania) amounted to 90,464,067 tons, valued at \$174,952,415, and bituminous coal and lignite to 405,724,241 tons valued at \$450,957,698. The decrease in production in 1911 was 5,408,070 tons, or a little over 1 per cent, in quantity, and \$3,646,908, or a little over 0.5 per cent in value. The decrease is attributed by Mr. Parker wholly to the depressed condition of the iron and steel trade in 1911, which was reflected in the decreased production of coke. The three leading coke-producing States alone showed an aggregate decrease of nearly 9,000,000 net tons of coal.

The decrease in the production of bituminous coal compared with 1910 was 11,386,901 tons, but this loss was largely made up by the increase in the production of anthracite, which was 5,978,831 tons greater than in 1910.

The total number of men employed in the coal mines of the United States in 1911 was 722,322, of which 172,585 worked in the anthracite mines of Pennsylvania. The average number of days worked in the anthracite mines was 246 and in the other mines 211. The average production per man was 3½ tons a day in the bituminous and lignite mines and 2.13 tons a day in the anthracite. The time lost by strikes in 1911 was insignificant.

The production of coal by States in 1910 and 1911 is shown in the following table:

Quantity of Coal Produced in the United States, 1910 and 1911, in Net Tons		
State	1910	1911
Alabama	16,111,462	15,021,421
Arkansas	1,905,958	2,106,789
California and Alaska	12,164	11,647
Colorado	11,973,736	10,157,383
Georgia	177,245	165,330
Idaho	4,448	1,821
Illinois	45,900,246	53,679,118
Indiana	18,389,815	14,201,355
Iowa	7,928,120	7,331,648
Kansas	4,921,451	6,254,228
Kentucky	14,623,319	13,706,839
Maryland	5,217,125	4,685,795
Michigan	1,534,967	1,476,074
Missouri	2,982,433	3,760,607
Montana	2,920,970	2,976,358
New Mexico	3,508,321	3,148,158
North Dakota	399,041	502,628
Ohio	34,209,668	30,759,986
Oklahoma	2,646,226	3,074,242
Oregon	67,533	46,661
Pennsylvania bituminous	150,521,526	144,721,303
Tennessee	7,121,380	6,433,156
Texas	1,892,176	1,974,593
Utah	2,517,809	2,513,175
Virginia	6,507,997	6,864,667
Washington	3,911,899	3,572,815
West Virginia	61,671,019	59,831,580
Wyoming	7,533,088	6,744,864
Total bituminous	417,111,142	405,724,241
Pennsylvania anthracite	84,485,236	90,464,067
Grand total	501,596,378	496,188,308

A New Reflector for Industrial Lighting

A very shallow type of porcelain enameled steel reflector, designed for service where the so-called flat types have heretofore been employed, has been developed by the Nelite Works of the General Electric Company, Euclid avenue, Cleveland, Ohio. The design of the Nelite Dome, as it is called, aims at minimizing glare effect and securing desirable distribution of light without sacrifice of efficiency. The dome type Holophane-D'Olier reflectors, it is explained, are particularly adapted to service in rooms with low ceilings or where the total area to be lighted is large in comparison with the distance between units.

The Nelite Works has improved its steel department manufacturing facilities and methods since taking over the Holophane business. Heavier steel is now used in the construction of all the smaller sizes of metal reflectors; a method of galvanizing has been perfected to render the bodies of aluminized reflectors impervious to moisture and fumes, and an oxy-acetylene process of welding the holders to the reflector bodies is now employed to make the finished units as solid as a single piece of metal. The developments have been carried on under the direction of Henry D'Olier, Jr.

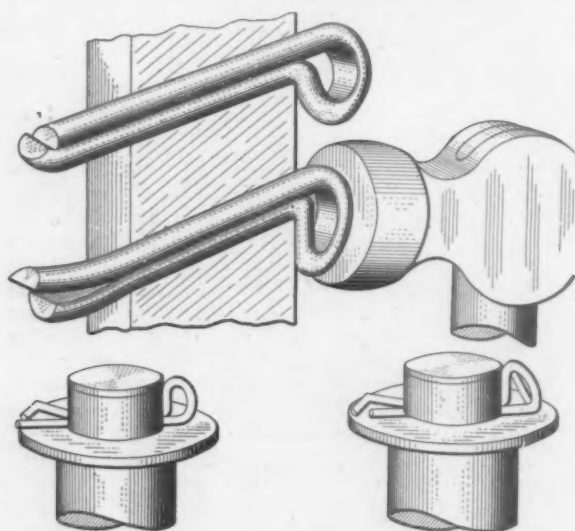
The Campbell Cotter Pin

Described by Its Originator, Andrew C. Campbell

The cotter pin, or spring cotter, seems to be of obscure origin; at least all efforts to get back to its original or even early use have been without avail. Possibly on fuller investigation it would develop that it sprung into existence exactly in its present well known form, and through a long period of years has defied all efforts to improve it. At least this is a reasonable conclusion since there are so few existing modifications of it. It seems to have met all requirements and there was therefore no incentive for the inventive mind to grapple with the problem of improving it, especially while its uses were so limited. That some thought was given to the subject, however, is shown by reference to the Patent Office records, though the dearth of ideas is surprising and very few patents seem to have been taken out, and most of them have proved quite impracticable.

That cotter pins are now very extensively used will be more and more apparent to one interested enough to investigate even casually, but the industry that has tended more than any other to bring them to the hands and understanding of the layman is probably that of automobile and auto-truck manufacturing.

It was recently remarked that automobiles "consist largely of nuts and cotter pins," and it probably does look that way to a man who has to take off or replace anything in an automobile, for there they are much used, not always because they are cheap, but because they are regarded as a safe fastener and are especially depended on



The Cotter Pin Made by A. C. Campbell, Waterbury, Conn. The upper sketch shows the pin being put in place; the lower sketches indicate how it may be removed.

to lock nuts and other parts in place, where subject to shock and vibration. It is easy to imagine the disastrous results which may follow from a broken or lost cotter pin, permitting a nut to loosen and drop by the wayside.

To insert a common cotter pin, the two limbs, which are normally spread apart at the points, must be pressed together so they will enter the hole and, except on the pins of small dimensions, this often requires that pliers be used.

It is possible that the original intention was to make a split pin which would hold in place through the friction of the two diverging branches in the hole, but from the present practice that idea seems to be largely abandoned in favor of the safer method of securing such pins, which is to force a wedge shaped tool between the two projecting ends and then by twisting and pounding them over they are finally spread to a position which, in the judgment of the operator, makes them surely safe.

As the purpose of cotter pins is to provide a quick and cheap method of securing parts, and one which will also permit their ready removal, a valuable feature is sacrificed by this process of spreading, since the difficulty of removing the pin is greatly increased and their second use is almost out of the question.

Now as a substitute for the well known spring cotter, one is being placed on the market made also from a piece of half-round wire bent merely in another form, and as all of the present makers of cotter pins adhere to the same shape and name, it is proposed to distinguish this new and easily recognized article as the Campbell cotter pin, though if a descriptive title were to be applied, self-spreading would define it, or even hammer-lock would be applicable for apparent reasons.

It consists of "a piece of half-round wire bent so as to provide an offset eye at one end and have two limbs of unequal length that extend with the flat surfaces adjacent, the tip of the long limb being bent at an angle across the tip of the short limb, whereby, when the eye is given a blow, the short limb will be driven longitudinally of the long limb and, by the engagement of the tips, cause a separation of the pin."

To make the description more readily understood the pin is here illustrated. The entering point is formed on one branch only, by the method of severing the wire combined with the offset bending. This gives a substantially conical point to the pin; the end of the other branch lies just behind this offset and in close contact with it. The eye or looped end is formed entirely on one (the long) branch of the wire and stands eccentric with reference to the pin's axis. In practice also the two limbs are slightly curved to stand open a little at the center while in contact at the points. This feature enables these pins to retain their position in a hole by friction only, when such holding is sufficient.

To use the Campbell cotter pin, one merely places it in the hole up to the shoulder under the head, and then strikes it on the head sufficiently hard to flatten the eye to about half its original height. This driving forces the straight branch further into the hole, but to go further in its end has to force the turned-up point of the other limb out of its path, with the inevitable consequence that the tips of the two branches are spread automatically. Not only are they thus forced apart but they are very firmly locked so that the pin cannot work out, nor in fact can one pull it out with pliers.

Owing to this construction and means of spreading the points, much shorter pins can be used than of the common type, which suggests a substantial saving.

Right here is an important feature of this new pin. It can be quickly and easily removed by the use of so simple a tool as the common screw driver or the tang of a file. After inserting the point of such a tool in the eye, the eye is twisted in the proper direction to expand the flattened eye and draw back the straight limb of the pin to its original position, with its inner end off from the point of the other. Under such conditions the pin can readily be withdrawn with the fingers and be used again repeatedly. In fact, one of these pins made from the ordinary cotter pin wire has been driven and removed fifty times before it broke. The new form of pin is inserted, locked and removed from the same side, and it is therefore possible to use it in places quite difficult of access and where the points are out of sight.

The General Electric Company's Large Dividend

The General Electric Company is arranging to pay a stock dividend of 30 per cent. A special meeting of the stockholders has been called, to be held August 29, for the purpose of voting on a proposition to increase the capital stock from \$80,000,000 to \$105,000,000. After this increase there will be paid to stockholders of record on December 31, 1912, out of the surplus earnings of the company, a dividend of \$30 per share, payable in the stock of the company at par. Such dividend is to recoup the stockholders in part for dividends passed or reduced in a period of years after 1893. For the future financial needs of the company it is proposed to issue debentures from time to time, and for this purpose the board of directors has authorized an issue of debentures bearing interest at 5 per cent. or less, the total to be limited to \$60,000,000. The specific statement is made that the stock dividend is not to be simply the declaration of a right to subscribe to stock, but is to be a payment in stock itself.

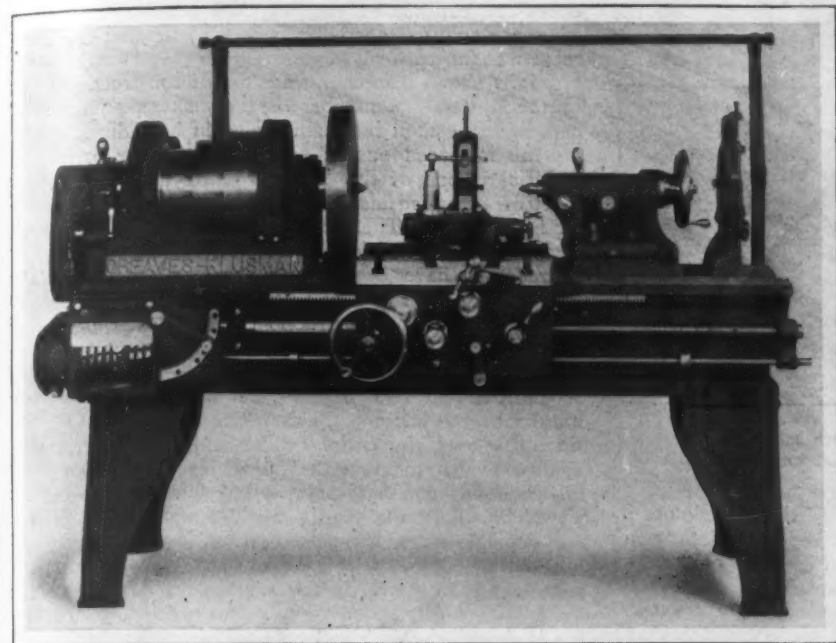
Quick Change Engine Lathe

A new 17-in. engine lathe with a three-step cone pulley and a friction double back gear has been recently placed on the market by Greaves, Klusman & Co., Cook and Alfred streets, Cincinnati, Ohio. In a general way the construction is the same as the company's standard

the heavy carriage directly under the tool rest and shorten the bridge which is unusually deep and wide. A conveniently operated compound clamp locks the carriage at any desired point. The regular double-plate box type of construction is employed for the apron, an arrangement that gives a bearing at each end for the hardened and ground studs upon which the gears run.

These are cut from the solid and are of ample proportions. Powerful frictions control the operation of the cross and longitudinal feeds, which can be reversed in the apron. The feed rod and the lead screw cannot be engaged at the same time. The compound rest which is of substantial construction is held securely at any angle by four locking bolts. Taper gibs are provided for the cross-feed and top slides, and the corresponding feed screws have micrometer dials.

Simple and compact construction is a feature of the quick change gear box which is of a new design, only two handles being required to care for the entire range of threads and feeds. The sliding lever at the left controls the fine changes and the lever and quadrant at the right compound them, the correct positions for the various rates being clearly indicated by the index plate. Solid steel is employed for the gears and the compounding gears run in an oil bath. The feed rod is supported at each



A New 17-In. Heavy, Quick Change Engine Lathe with 6-Ft. Bed, Built by Greaves, Klusman & Co., Cincinnati, Ohio

single back geared lathe, but the self-adjusting friction double back gears with the full-length horizontal shifting bar are new, as is also the clutch for independently engaging and disengaging the lead screw or the feed rod by a conveniently located handwheel on the gear box.

The friction double back gear mechanism consists of two pinions keyed to the cone pulley, two back gears with friction clutches fitted in recesses at their outer ends and mounted on a quill shaft with a pinion at the opposite end of the quill engaging with the face wheel. Simple construction is a feature of the frictions which have two friction rings fitted upon the quill in the recesses of the gears with two toggles fitted in each ring. These toggles act as levers when the wedge-shaped key is engaged by moving the shifting bar. The location of the horizontal shifting bar is such that either of the back gears can be instantly engaged without it being necessary for the operator to leave his working position, as the bar extends the full length of the lathe. These frictions are self-adjusting for wear and are claimed to possess sufficient strength to transmit the maximum pull of the belt.

A new type of bed is used in which all twisting strains are said to have been minimized by heavy reinforcements under the V's that extend below the top of the girths. Massive construction characterizes the headstock which is webbed throughout its entire length. By placing the center line of the head and tailstocks back of the center line of the bed, it is pointed out that not only is the overhang of the tool done away with when large diameter work is being turned, but a deep web can be placed between the headstock housings and a large-diameter cone pulley which gives ample driving power employed. The tailstock spindle is longer than usual and telescopes through a thimble at the rear. It is gripped at both ends of the barrel by two sets of double plug clamps and the bearing at the forward limit of its travel is the full length of the spindle. A single handle operates the spindle and the clamping device. Three bolts secure the tailstock to the bed and set over screws and a graduated index are provided for taper work. The shape of the tailstock is such that the compound rest can be set at an angle of 90 deg. when small-diameter work is being handled.

Full-length bearings on each V and a wide, flat bearing inside the front one provide a substantial support for

end of the apron and the longitudinal feeds in either direction can be stopped automatically. Although the regular range of threads extends from 2 to 56 per inch, including an 11½ pipe thread, it is possible to cut special threads by substituting various change gears on the studs at the head end. For use when thread cutting is being done, the lathe is fitted with a chasing dial that permits the thread to be caught at any point without reversing the lead screw. The use of this arrangement permits both countershaft pulleys to run forward and a wide range of spindle speeds, from 10 to 370 r.p.m., is available. There are 18 separate speeds in this range and as six of them can be secured without shifting a belt, it is possible to select the proper speeds for roughing and finishing the work conveniently.

The Emerson-Brantingham Company Absorbs More Plants

The Emerson-Brantingham Company, Rockford, Ill., has bought the business and plant of Reeves & Co., Columbus, Ind., for \$2,500,000. Reeves & Co. manufacture threshing outfits, sawmill machinery, clover hullers, tractor motors, etc., and have 16 branch houses in the West and Northwest. M. T. Reeves and W. H. Haggard will retire from active business. John N. Kailor will remain as superintendent. The Reeves plant was started 37 years ago by M. T. Reeves on a small scale, to manufacture the Hoosier Boy cultivator. Later he invented a stacker which proved a success, and the growth of the plant was rapid thereafter. The Emerson-Brantingham Company has also bought the Geiser Mfg. Company, Waynesboro, Pa., manufacturing threshing outfits, in addition to the properties named on page 211 of *The Iron Age* of July 25.

The Lynchburg Foundry Company, Lynchburg, Va., a few days ago started a train of 30 cars loaded with 30-in. cast-iron pipe from its Radford Pipe Works at Radford, Va., destined for Los Angeles, this being the first of three trains to be sent to that point from Radford. The total freight to be paid on these three trains of pipe is \$19,360.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

A New Type of Floor Construction

A system of two-way steel floor dome reinforced concrete construction known as the Floredome type has been developed by the Trussed Concrete Steel Company, Detroit, Mich. The essential feature of this construction is a rectangular dome-shaped steel tile with only the bottom side open. The special advantages claimed for this system are the providing of additional reinforcement for the concrete, light weight, tight joints and freedom from

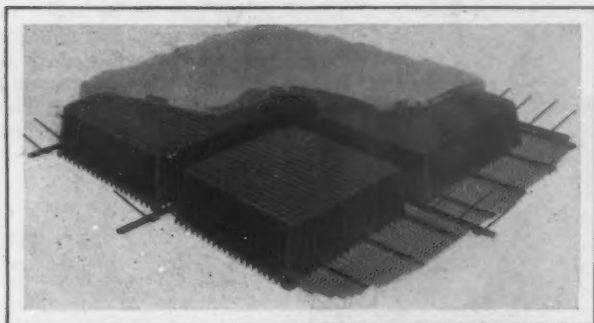


Fig. 1—A New Type of Construction Known as the Floredome Developed by the Trussed Concrete Steel Company, Detroit, Mich.

breakage in transit. Fig. 1 is a view of the Floredomes in position showing the arrangement of the metal lath, reinforcing rods and the concrete and Fig. 2 is reproduced from two photographs taken in a building in course of construction where this system was used.

As will be noticed from Fig. 1 the Floredomes are made by a process of cold pressing from rolled steel plates and the deep corrugations provide additional stiffness so as to support the loads imposed upon them by the material which is trucked over them. These ridges also give an improved bond between the domes and the concrete and act as extra reinforcement for the latter. It is pointed out that in combination with reinforced concrete joists these domes make an ideal construction for floors and roofs since they take the place of a portion of the concrete and thus reduce the dead weight of the construction without impairing its strength. These joists extend on all four sides and transmit the loads in two directions to the supports.

The floors made in this way are very deep which gives

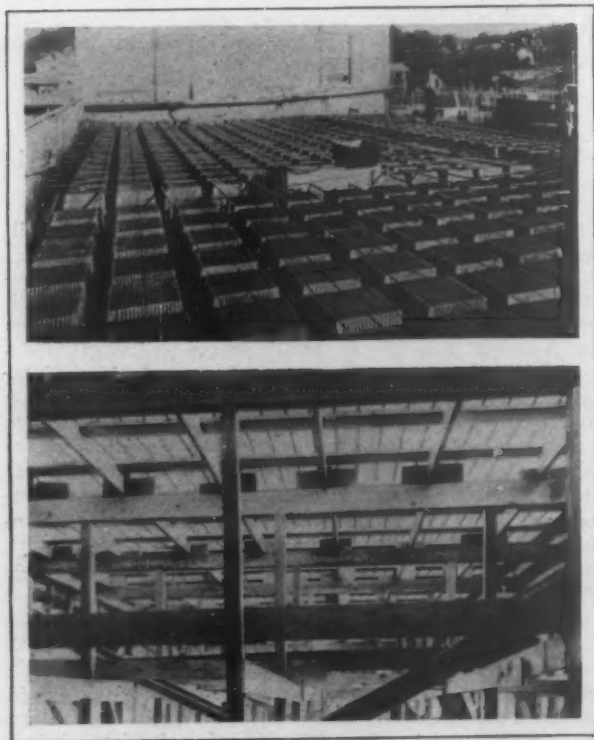


Fig. 2—Views Taken Above and Below a Floredome Floor During Its Construction

an increased strength and rigidity to the construction with a reduction in the amount of material required for beams, columns and footings. The Floredomes are much lighter than terra cotta floor arches and are about three times as large which results in doubling the amount of floor laid by the average workman. All loss of concrete between the joints in the floor is said to be done away with as the joints are absolutely tight. The light weight reduces the expense of shipping and handling and as the sides are slightly tapered it is possible to nest the domes to give a full carload shipment.

Fig. 1 shows the general method of constructing a floor by this system. A number of the maker's reinforcement bars are laid upon the main beams in both directions and Hy-Rib is placed on the underside of these bars. This material is one of the Kahn products and consists of a sheet of expanded metal with a number of raised triangular bars or ribs. These bars fit into notches in the lower edge of the dome and serve to keep it in place. After the Floredomes have been put in position, the concrete is poured over them and tamped in place in the regular way. By employing this construction an absolutely flat ceiling design without any projecting beams or girders can be obtained as the reinforced concrete girders which extend around the four sides of the panel are built flush with the bottom of the concrete joists. The Hy-Rib extends continuously over the entire ceiling and the plaster can be applied to its underside. The reinforcement extends in all directions and it is pointed out that there is little or no likelihood of the plaster cracking and falling. Where flat ceilings are not required as in factories and warehouses, the Hy-Rib is omitted and the domes remain permanently in place. In this way a considerable saving in the cost of construction is effected as practically all centering is done away with and only the simplest type of false-work is required.

New Fire Extinguisher Sprinkler Head

The list of approved sprinkler heads published by the laboratory of the National Board of Fire Underwriters now shows the Garrett, issue A, manufactured by the Globe Automatic Sprinkler Company, Cincinnati, Ohio. The entire head is made of phosphor bronze. The frame is a casting of this metal, but the strut structure holding the fusible line is made of rolled phosphor bronze to get the greater strength resulting from this treatment of the metal. This fact is regarded as forming an element of protection to the sensitive fusible link. The protected feature of the strut and fusible link is increased by their position within the line of the frame so that the sensitive portion cannot readily come in contact with moving bodies or accidental blows which might cause the head to open.



Garrett Sprinkler Head

The stored energy in the shape of a spring to operate the head upon the fusing of the solder surface from heat is provided by the elasticity which the metal of the strut structure possesses. The intrinsic spring of the metal is made effective by a torsional strain put upon the frame in assembling.

Jones & Laughlin to Duplex

About the middle of August, as mentioned briefly in *The Iron Age* a fortnight ago, the Jones & Laughlin Steel Company will begin the regular practice of the duplex process at the Aliquippa plant, which is provided with four blast furnaces, four 250-ton Talbot tilting open-hearth furnaces, a 400-ton metal mixer and a 20-ton Bessemer converter, the last named having just been installed.

The company has been making steel at Aliquippa by the regular pig and scrap process for more than a year, but

the plans for the Aliquippa plant have all along contemplated the ultimate adoption of the duplex process. Before these plans were completed exhaustive tests of the process were made at the company's original works, in Pittsburgh, with Talbot furnaces and with one of the regular Bessemer vessels. There is no present intention of practicing the duplex process at the Pittsburgh plant, however.

Of late the company has been blowing three of the four Aliquippa blast furnaces, the output being slightly more than sufficient to supply the Talbot furnaces, when using the regular process. Preparatory to instituting the use of the duplex process the fourth blast furnace will be blown in, since it then will require the entire product of the four furnaces to supply the steel works. The output in steel ingots will be increased from about 1000 tons to nearly 2000 tons daily, and no scrap will be used except such as is made at Aliquippa, in the billet, rod and tin plate mills.

The change in process is of considerable interest, as it will mark the first regular employment of the duplex process in the Pittsburgh district, which has heretofore been so liberally supplied with scrap that the duplex process, essentially one to remove the necessity for scrap, has not been given serious consideration. It is regarded as not improbable that eventually the duplex process may be adopted at the Carnegie Steel Company's Edgar Thomson plant, where open-hearth furnaces are now being built in addition to the Bessemer converters, though no statement has been made of any such intention at present.

The Electric Truck

An authority on the motor truck industry states that the percentage of shrinkage in horse-drawn vehicles in Chicago in the past year amounted to 15.7 per cent. for one-horse wagons, and 13.5 per cent. for two-horse wagons. The aggregate shrinkage is 14.7 per cent. for the year. Altogether, 6753 horse-drawn vehicles were discarded in Chicago between May 1, 1911, and May 1, 1912. Since an electric truck handles tonnage equivalent to that of three two-horse wagons, the saving in time, money and congestion of traffic becomes truly tremendous.

Several advantages are set forth in favor of the electric truck in the displacement of the horse-drawn truck. Ordinarily intelligent wagon drivers readily familiarize themselves with the operation of an electric truck and cover their old routes as perfectly, as swiftly, as formerly. In nine cases out of ten the routes become greatly amplified—they cover more territory. Should the driver be unable to resist the natural temptation to rush the electric truck at top speed back to the garage at the close of the day, it refuses to go faster than is necessary, it being geared to run at a certain maximum speed, and no faster. This speed, while ample for commercial purposes, lessens the inclination to tear wear-resistance out of trucks and mechanical parts by fast driving.

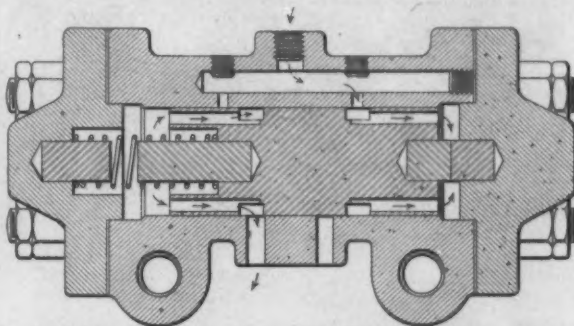
The average life of an electric truck, based on actual records, is at least 10 years, with a consequent depreciation charge of 10 per cent. yearly. The average life of even the best Percheron draft horse is only four years, the depreciation therefore being correspondingly higher, or 25 per cent. Interesting figuring is thus furnished to the man who is worried about how to successfully combat the certainty of depreciation charges in his business.

British Museum of Safety Appliances.—In connection with the proposed British Museum of Safety Appliances, says the London Iron and Coal Trades Review, it is now stated that the Home Office has secured a site at Westminster, that plans have been prepared and that the building will be begun as soon as possible. Institutions of the kind have existed for some time at Paris, Berlin, Vienna, Munich, Amsterdam and Zurich, in addition to other important centers, and where employers, workmen, engineering students and inspectors can obtain access to them, they have been much appreciated. It is not intended to limit the scope of the British museum to mechanical devices for the prevention of accidents, but to embrace industrial hygiene for the prevention of diseases of occupation, and to illustrate the correct principles of ventilation, lighting, etc.

Molding Machine Vibrator

A new molding machine vibrator is being placed on the market by the Osborn Mfg. Company, Cleveland, Ohio. The claim is made for this vibrator that it will not stick under any circumstances and will immediately respond to air pressure at all times. Another important feature is its rapid vibration, approximately 12,000 vibrations per minute, and it is stated that this high rate merely loosens the pattern and does not enlarge the mold.

The vibrator may be attached directly to the molding machine or to the pattern. The body is made of cast iron and the piston is of steel, sufficiently heavy to give ample strength to the vibrator without the appearance of clumsiness. It is pointed out that the bearing of steel against the cast iron gives good wearing surface. At either end of the body are set hardened tool steel pins which receive



Sectional Elevation of the New 1 3/4-In. Molding Machine Vibrator Built by the Osborn Mfg. Company, Cleveland, Ohio

the blow of the piston. Sunk into one end of the vibrator and surrounding the pin is a tempered steel wire spring. The arrangement of the ports is an important feature as it is this principally which prevents the vibrator from sticking. A fine finish of the parts due to careful machining is another feature designed to make the vibrator respond instantly when air is admitted and to prevent sticking. A convenient oil inlet is provided.

Each vibrator is tested before leaving the shop and is given a serial number so that it can be traced. The vibrator is made in five sizes, from 3/4 to 1 3/4 in. In conjunction with the vibrator the company is offering a practical type of knee valve which is said to respond instantly to the will of the workman, not to leak and to be, like the vibrator, almost proof against wear.

The Rivett Lathe & Grinder Company

The Rivett Lathe & Grinder Company has been incorporated to succeed to the business of the Rivett Lathe Mfg. Company, Boston, Mass. Edward Rivett, who has been widely known for many years as a manufacturer of precision tools of the highest grade, is at present enjoying a much needed rest in Europe. His return in October to assume his duties as president of the new corporation will insure the maintenance of the high reputation of his products. He will have associated with him, as vice-president and general manager, W. H. Shafer, formerly superintendent of the Cincinnati-Bickford Tool Company; as secretary-treasurer, R. G. Morse, formerly with the General Electric Company; as superintendent, G. S. DeLany, formerly in a similar capacity with the Stevens-Duryea Company. The address of the company is Brighton, Boston, Mass.

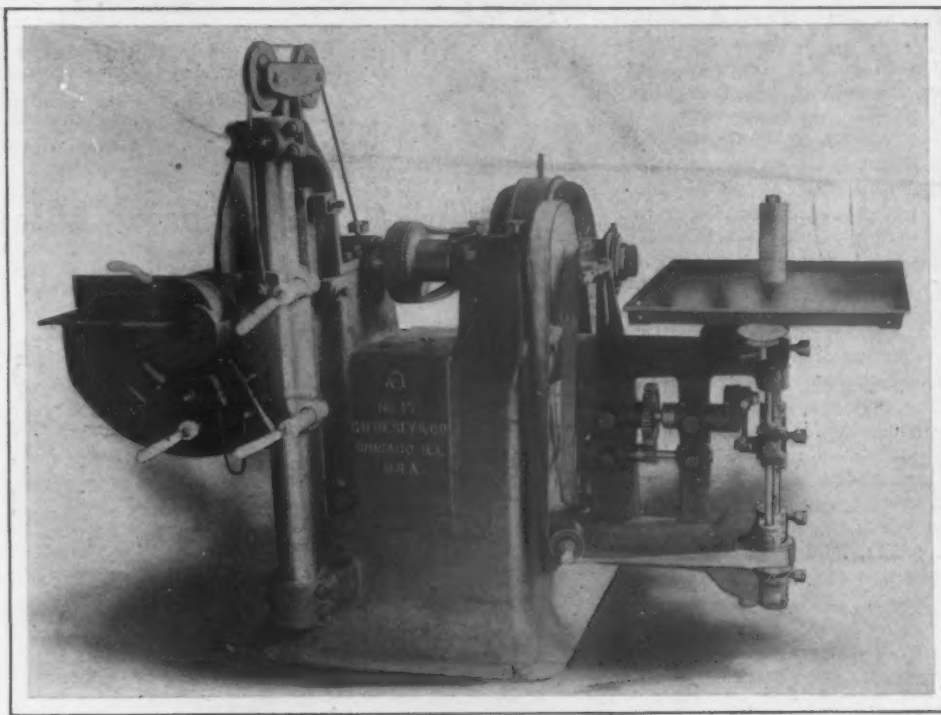
The Northern Bolt & Screw Company, Ltd., Owen Sound, Canada, of which J. H. Cole is manager, is making rapid progress in the erection of its plant. One building, 650 ft. long and 40 ft. wide, has been completed, and another is being erected which will be 440 ft. long and 82 ft. wide. These buildings are to be equipped with machinery for wire drawing, nail making and bolt and screw making. Most of the bolt-making equipment has been purchased, but the company expects to be in the market soon for wire mill and nail making apparatus. J. M. Kilbourn is president; D. M. Butchart, E. J. Harrison and H. B. Smith are vice-presidents; F. H. Kilbourn is secretary and treasurer. These gentlemen and F. W. Harrison and A. B. Hay are directors.

Combination Pattern Making Machine

For use in pattern making shops, Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill., have placed on the market a combination disk grinding and drum sanding

ing engraving the machine is shown equipped with a sand drum $2\frac{1}{2}$ in. in diameter and $8\frac{1}{2}$ in. long but drums ranging from 1 to 6 in. in diameter and of any reasonable length may be used. The drum runs at the rate of 2250 r.p.m. and has a perpendicular reciprocating movement while running to equalize the wear on the abrasive. This movement is actuated by a crank and link and is adjustable from zero up to a maximum of 4 in.

The machine is driven by a 3-hp. motor mounted on a bracket bolted to the rear of the machine bed and the drive is through sprockets and a Link Belt maximum silent chain. The drum sanding attachment is driven through a Johnson self-oiling friction clutch, an arrangement which enables the operator to stop the sand drum independent of the disk wheel. This, it is pointed out, is a great advantage since the disk wheel is usually allowed to run continuously while the sand drum must be stopped to change the size for different work. The spindle for the sand drum is driven by a 2-in. quarter-turn belt while



The New No. 15 Combination Disk Grinding and Drum Sanding Machine Built by Charles H. Besly & Co., Chicago, Ill.

machine. This machine is designed for grinding flat surfaces on wood and is claimed to be an efficient tool for joining, beveling, mitering and finishing woodwork where fine finish, exact angles and accurate dimensions are required. Although intended primarily for working in wood, it can, nevertheless, be employed on metal pattern work. Cylindrical grinding such as rounding corners or core prints and in some cases rounding cylinders and cones can also be done.

Like the disk grinding machine which was illustrated in *The Iron Age*, October 19, 1911, the grinding is done by garnet or abrasive paper sheets, cemented to the faces of steel disk wheels. The wheel in this machine which is known as the No. 15-30-C disk grinding machine is 30 in. in diameter, $\frac{1}{4}$ in. thick and runs at a speed of 750 r.p.m. The work table serving this wheel is 14 in. wide and 40 in. long and can be tilted and locked at any angle from 75 to 135 deg. from the plane of the grinding disk, large distinct graduations being provided to govern the angular adjustment. In common with the other machines built by this company, the inner or working end of the table remains within $1/32$ in. of the wheel regardless of the angular adjustment and the supporting mechanism is back of the wheel and below the face of the table so that the top is always free from obstructions from one end to the other. A vertical adjustment of 25 in. is available and as the table is supported by a round vertical shaft it can be swung away from the grinding disk for convenience in resetting the wheel or facing off extra large patterns. Four attachments, a sizing circle gauge for cylindrical and conical grinding, a sliding bevel gauge for simple and compound angle grinding, a sizing bevel gauge for simple and compound angle grinding to dimensions and an angle plate for free hand cornering of thin work are furnished with the machine.

The drum sanding attachment at the right of the machine has a work table measuring 24 x 28 in. which can be tilted and locked at any angle from 85 to 105 deg. from the axis of the sand drum. Like the adjustment of the work table of the grinding machine, this adjustment is controlled by a series of graduations. A central round opening $8\frac{1}{2}$ in. in diameter into which circular plates with center holes to accommodate the various sizes of drums are fitted is located in the work table. In the accompany-

ing the reciprocating crank is driven through gearing by a $1\frac{1}{2}$ -in. belt. The machine carries a telescoping dust hood which may be piped to an exhaustor for withdrawing the grinding dust. The machine is made with 30 or 40 in. disk wheels and is either belt or motor driven. The floor space occupied by the machine measures 54 x 34 in. and the weight is 2400 lb.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, reports the receipt recently of the following orders: Two skip hoists for coal and ashes, Youngstown Sheet & Tube Company; ash hoist, Midvale Steel Company; ash hoist, Cleveland Electric Illuminating Company; two brick plants, Farr Bros., Cleveland; a brick plant, 300-hp. power plant and coal handling equipment, George Clippert, Detroit, Mich.; garbage handling equipment, together with elevators and conveyors, Borough Development Company, Boston, Mass., and an elevating and crushing plant, Rhode Island Glass Company, Central Falls, R. I.

An international customs duty congress is to be held in Paris in May, 1913, according to a decision made by the French Cabinet, July 27. All the powers, including the United States, are to be invited to be represented at the congress, which is to discuss questions of tariff and of general economic interest, with the object of facilitating and developing the commercial relations between the nations of the world.

The New York Telephone Review states that 460 miles of copper wire will be used in the great Woolworth Building, New York, for making the necessary telephone connections in that structure. The distributing frame will have a capacity of 4000 lines, and the cable containing the wire will have a total length of 5500 ft. The estimated cost of this work is \$6,500.

The Phoenix Iron Company, Phoenixville, Pa., which has a contract for eight bridges to be erected over the Jumna River, near Delhi, India, for the British Government, on July 18 shipped four spans 250 ft. long, on the steamship Wildenfels, for delivery at Calcutta.

Baltimore Business and Industrial Notes

The Industrial Building, which has been generally termed the Bee Hive plant, a building erected for the housing of small manufacturing plants requiring power, was formally opened July 24. Alexander Harvey of the Detrick & Harvey Machine Company and president of the Industrial Company presided. P. O. Kielholt, engineer, and J. E. Aldred, president of the Consolidated Gas, Electric Light & Power Company, made addresses. The building is seven stories, of steel and concrete, and its erection was begun early last summer.

Secretary A. S. Goldsborough of the Factory Site Commission of Baltimore states that, while several projects for the establishment of new industries at various sites are under negotiation, there is a disposition to withhold definite action, particularly when the project is of any importance, until later in the year, due, in a measure, to hesitancy regarding the result of the Presidential election.

A number of local contractors have submitted bids for a new bank building for the Citizens' National Bank, Raleigh, N. C. About 350 tons of structural steel will be required.

The Dix Mfg. Company, manufacturer of the Dix noiseless door hanger, reports a marked improvement in the demand for its equipment, particularly from the West and South. The New England trade is reported dull. Plant operations are on a better basis and a continued improvement in the demand is anticipated.

The Aumen Machinery Company reports a fair month's business, particularly in metal working tools and electrical power equipment. The demand for woodworking machinery has been particularly quiet. Sales have been confined to single tools or small groups, few inquiries covering any extensive equipment coming out.

The Ellicott Machine Company notes a quieter demand for dredging machinery, in which it is a specialist. New business develops slowly, although both its local plants are fully engaged and have sufficient work on hand to keep them so occupied for several months.

While few municipal projects of interest to the machinery trade are under consideration, plans for several additions to municipal plants are being drawn by city engineers. It is stated that the proposed extension of the heating and water system in the City Hall has been abandoned, owing to the increased demand involved on the municipal power plant.

The Chesapeake Iron Works is fairly busy, but recent orders have been mostly confined to small building projects. A contract has been entered for the steel work for a manufacturing building for the British American Tobacco Company, Richmond, Va., involving some 350 tons of structural steel work. A very fair business in miscellaneous plain material is reported.

Dietrich Brothers have booked a larger volume of business in fabricated structural steel work. Orders have been taken for the Garrett Building, involving about 700 tons, for which the Standard Concrete Steel Company has the contract. They will fabricate the steel work for the Hotel Albion, 100 tons, also the Educational Alliance Building, 50 tons, and have entered a number of miscellaneous contracts, including one for structural work for extensions to the plant of the Baltimore Mfg. Company. General business is reported good and the various departments of the plant are fully engaged.

The Alexander Milburn Company, manufacturer of acetylene apparatus, which has recently developed a new line of apparatus for cutting and welding by oxy-acetylene gas, has been installing a number of these outfits and has recently taken orders for installations for the Crucible Steel Castings Company, Lansdowne, Pa.; King Ganey Construction Company, New York; Ellicott Machine Company, Baltimore, Md.; Buzzaro & Co., Washington, D. C.; Caspario Stone Company, Columbus, Ohio, and the United States Revenue Service, Arundel Cove, Md. The greater part of these installations included both generating apparatus and torches.

The T. C. Bashor Company notes rather quiet conditions in new business, although all departments of its plant have been busy on work in hand. Orders have recently been booked for an extensive pipe and heating contract for the Lucy Webb Hays Training School, Wash-

ington, D. C. A four-way valve Nagle Corliiss engine is to be installed for the Sweet Briar Institute, Sweet Briar, W. Va. A water system will be installed for the Western Maryland Railway, at Hagerstown, Md. Several boilers have also been sold, including one for the Baltimore & Ohio Railroad. Considerable business is being figured on, and the outlook for a better buying movement is considered favorable.

Riggs, Distler & Stringer have received the contract for installing the heating and vacuum cleaning systems, boilers for fire protection service, pumps, etc., in the new building of the Title Guarantee & Trust Company. Two 80-hp. marine boilers and a steel stack will be installed. C. L. Reeder is the consulting engineer. Power plant extensions will be made for the Pikesville Dairy Company, and power plant changes will be made for Erlanger Brothers, shirt manufacturers. Sales of a number of small boilers are reported.

Applications have been filed for permits for the erection of a new warehouse and factory at Lipp lane and Hollins street, for Frederick W. Lipp. The building will be four stories, 80 x 165 ft., and will include elevators and a heating system.

The F. E. Schneider Paving Company is having plans prepared, it is stated, for a four-story concrete building, with steel frame, to be erected on Laurens street and the Western Maryland Railroad, to replace that recently destroyed by fire. Details are not available.

An 11-story office building, 53 x 100 ft., is to be erected for Robert Garrett at the southwest corner of German and South streets. It will be largely of brick construction, from plans by Wyatt & Nolting, architects.

A syndicate headed by E. F. Goltra of St. Louis is considering the establishment at Houston, Tex., of a city modeled after Gary, Ill. A site of 4000 acres on the Houston ship canal has been purchased, and the company which is planned to control the operations will be known as the Southwestern Steel Corporation, with initial capital of \$10,000,000. George M. McIlheny of New York is interested in the promotion. The plan includes the development of East Texas ore lands. Houston men interested in the transaction are John H. Kirby, J. M. West, S. F. Carter, A. S. Vandervoort and James F. Sadler. Other St. Louis and New York capitalists will be connected with the company, which proposes to create a town to be known as Steel City.

The L. S. Starrett Company, maker of fine mechanical tools, Athol, Mass., has issued a booklet descriptive of its store at 17 North Jefferson street, Chicago, of which A. T. Fletcher is manager. Views of various portions of the store are given, which are impressive as showing its extent and the manner in which it has been systematized. It is equipped with the most improved labor-saving devices, while unusual care and strict attention are exercised by most competent help in handling details intelligently and speedily. This store carries a complete assortment of Starrett tools and is therefore prepared to fill orders promptly.

More than 60 lives were lost on Wednesday, July 24, by floods and cloudbursts in western Pennsylvania and West Virginia. Uniontown leads the list of known dead with 15. Many cities were inundated, railroad traffic through a great territory was demoralized, and scores of families were rendered homeless. The greatest loss of life was due to the flooding of the Superba coal mine at Evans, nine miles from Uniontown. The flood in the Monongahela River was so high that for a time much apprehension was entertained of serious damage to iron and steel works located on the banks of that river in and near Pittsburgh.

A press dispatch from Athens, under date of July 26, states that a contract has been awarded to the Bethlehem Steel Company for the supply of the armor and guns for the new armored cruiser Greece, which is to have a displacement of 14,500 tons. The hull of the vessel is to be built in the Vulkan Shipbuilding Yards at Stettin, Germany.

Pig Iron Production for the Half Year

(See Table on Opposite Page.)

James M. Swank, vice-president and general manager of the American Iron and Steel Association, Philadelphia, has collected from the manufacturers complete statistics of the production of pig iron in the United States in the first half of 1912 and they are printed in the current issue of the Bulletin. Following is a summary of the figures, as given in the Bulletin:

Total Production

The production of all kinds of pig iron in the first half of 1912, including spiegeleisen, ferromanganese, ferrosilicon, ferrophosphorus, ferrotitanium, ferrovanadium, etc., amounted to 14,072,274 gross tons, against 11,982,551 tons in the last half of 1911 and 11,666,996 tons in the first half. The following table gives the half-yearly production since 1909:

Gross tons.	1909.	1910.	1911.	1912.
First half....	11,022,346	14,978,738	11,666,996	14,072,274
Second half..	14,773,125	12,324,829	11,982,551	.....
Total	25,795,471	27,303,567	23,649,547	.....

The increase in production in the first half of 1912 as compared with the second half of 1911 was 2,089,723 tons, and as compared with the first half of 1911 it was 2,405,278 tons.

Classified Production

The production of Bessemer and low-phosphorus pig iron was 5,572,355 tons, against 4,704,879 tons in the last half of 1911, an increase of 867,476 tons, and 4,704,424 tons in the first half of 1911. The production in the first half of 1912 includes 134,162 tons of low-phosphorus iron, against 155,815 tons in the last half of 1911 and 126,645 tons in the first half.

The production of basic pig iron, not including charcoal of basic quality, was 5,405,376 tons, against 4,584,533 tons in the last half of 1911 and 3,935,487 tons in the first half.

The production of charcoal pig iron was 166,366 tons, against 117,541 tons in the last half of 1911 and 161,135 tons in the first half. A few tons of low-phosphorus pig iron and ferroalloys made with charcoal and electricity are included.

The production of spiegeleisen and ferromanganese was 93,161 tons, against 107,123 tons in the last half of 1911 and 77,595 tons in the first half. The production of spiegeleisen alone was 36,145 tons, and of ferromanganese alone the production was 57,016 tons.

The production of bituminous coal and coke pig iron amounted to 13,840,251 tons, as compared with 11,784,662 tons in the last half of 1911; the production of anthracite and coke mixed was 64,999 tons, against 72,052 tons in the last half of 1911; of anthracite alone the production was 658 tons, against 8,296 tons in the last half. The bituminous figures include small quantities of ferroalloys made with coke and electricity, coke and natural gas, etc.

Furnace Figures

The whole number of furnaces in blast June 30 was 266, against 231 on December 31, 1911, and 212 on June 30, 1911. The number of furnaces idle, including furnaces being rebuilt June 30 was 200, against 235 on December 31, 1911, and 201 on June 30, 1911.

In the first six months of 1912 the number of furnaces actually in blast for a part or the whole of the time was 302, against 275 in the last half of 1911 and 297 in the first half of that year.

On June 30 there were 7 entirely new furnaces in course of construction, 6 of which will use mineral fuel and 1 will use charcoal, as follows: Pennsylvania, 2; Virginia, 1; Ohio, 1; Michigan, 1; and Minnesota, 2. In addition 1 coke furnace in Virginia was partly erected but work had been suspended for several years.

On June 30, 5 old furnaces were being rebuilt, all mineral fuel, as follows: New York, 1; New Jersey, 1; Alabama, 2; and Ohio, 1.

In the first six months of 1912 eight entirely new furnaces were completed, namely, 2 in New York, 3 in Pennsylvania, 1 in Indiana, and 2 in Illinois. All are coke furnaces. Their total annual capacity amounts to 1,039,500

tons. Down to June 30 five of these furnaces had been blown in.

In the first half of 1912 there were 7 furnaces abandoned, namely, 2 furnaces of the Poughkeepsie Iron Company, Poughkeepsie, N. Y.; Hackettstown furnace of the Carteret Steel Company, Hackettstown, N. J.; 2 Henry Clay furnaces of the Empire Steel & Iron Company, at Reading, Pa.; and 2 furnaces of the Susquehanna Iron Company, one at Wrightsville and the other at Watts, Pa. These furnaces had an annual capacity of 215,000 tons. Six used anthracite coal and coke and 1 used coke.

Petroleum Production in 1911

Petroleum production in the United States in 1911 was 220,449,391 barrels, surpassing its own record, which was made in 1910, by nearly 11,000,000 barrels. In 1910 the output was 209,557,248 barrels. The total production of the world also surpassed all previous records, amounting to over 345,000,000 barrels, and of this the United States produced more than 63 per cent. The value of this enormous output of oil in the United States for 1911 was \$134,044,752, the average price being 60.8 cents a barrel. Final figures have been compiled by Dr. David T. Day, of the United States Geological Survey, and have just been made public.

The increase for the year was caused principally by the gain in California, which was by far the largest producer. Another factor in the increase was the discovery of oil at Vinton, La., and the comparatively new Caddo field in Louisiana also grew in importance. A find of high-grade oil at Electra, in northern Texas, was another notable event of the year. Oklahoma extended its field well into Osage and Pawnee counties, and oil was discovered still farther west, in Kay County, considerably increasing the Mid-Continent yield. All these gains in the Mid-Continent field, however, were offset by the declines in Illinois and states farther east; in short, all fuel oils increased and refinery oils declined. It is a matter of interest that the demand for gasoline has become so imperative that little or none is now allowed to lower the safety of lamp oils; the latter have therefore greatly improved in character.

In the production for 1911 California led off, with 81,134,391 barrels; Oklahoma took second place, with 56,069,637 barrels; Illinois was third, with 31,317,038 barrels, and Louisiana was fourth, with 10,720,420 barrels. The prices of the different oils varied greatly, ranging from 47 cents to \$1.32 a barrel. Thus while the production in Pennsylvania was only 8,248,158 barrels, its value was \$10,894,074, whereas Louisiana, which produced 10,720,420 barrels, received for it only \$5,668,814.

The American Railway Association reports an increase of nearly 5000 in the number of idle cars on the railroads of this country and Canada on July 18. It is explained that this increase was probably due to the improvement in the business outlook. With all indications pointing to almost a record year's crops, the Western railroad lines have been setting aside and distributing box cars in anticipation of the crop movement. The net surplus July 18 was 68,922, against 149,102 on the corresponding date last year. The end of October is stated as likely to bring reports of serious shortages on many of the grain carrying roads, in spite of the large amount of new equipment which has been delivered in recent months.

The William Tod Company, Youngstown, Ohio, has built a 500-ton pure hydraulic rapid acting forging press for the Canada Forge Company, Welland, Ont., Canada. This press is built according to the Astfalck System of Hydraulik G.b.m. H. of Duisberg, Germany, and is capable of making 80 strokes per min. at full capacity. This is done with one lever control. It is especially adapted for die forging.

The Davis & Furber Machine Company, North Andover, Mass., is about to start operations in its new core-baking and brass-melting departments. It is installing melting furnaces and reel type core ovens made by the Rockwell Furnace Company, New York.

PRODUCTION OF PIG IRON IN THE UNITED STATES IN THE FIRST SIX MONTHS OF 1912.

Statistics collected from the Manufacturers by The American Iron and Steel Association, all in Gross Tons.

Production in the First Half of 1911, 11,666,996 Gross Tons; Second Half of 1911, 11,982,551 Tons; First Half of 1912, 14,072,274 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States.	Blast Furnaces.			Production—Gross tons.		
	In blast Dec. 31, 1911.	June 30, 1912.		(Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)		
		In.	Out.	First half of 1911.	Second half of 1911.	First half of 1912.
Massachusetts.....	1	1	2	6,424	3,225	8,793
Connecticut.....	1	3	0			
New York.....	18	17	29	833,467	729,289	880,581
New Jersey.....	0	1	7	39,277	1,386	2,773
Pennsylvania.....	91	108	55	4,822,832	4,984,241	6,035,773
Maryland.....	2	2	3	131,531	124,285	107,027
Virginia.....	7	6	19	159,996	133,640	120,127
Georgia.....	0	0	4			
Texas.....	0	0	4	1,200		
Alabama.....	22	19	30	809,795	902,416	887,512
West Virginia.....	3	2	2	130,455	161,017	129,155
Kentucky.....	2	1	7	46,493	48,709	24,017
Tennessee.....	8	9	10	165,722	158,926	145,076
Ohio.....	44	49	26	2,740,142	2,570,364	3,285,752
Illinois.....	14	20	6	882,807	1,225,195	1,304,227
Indiana.....	7	10	0			
Michigan.....	8	10	5	532,056	611,876	798,252
Wisconsin.....	4	3	4			
Minnesota.....	0	1	0	147,477	129,330	153,420
Missouri.....	1	1	1			
Colorado.....	3	3	3			
Oregon.....	0	0	1	197,322	198,646	199,789
Washington.....	0	0	1			
California.....	0	0	0			
Total.....	231	266	200	11,666,996	11,982,551	14,072,274

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York.....	13	17	7	24	833,467	729,289	880,581
New Jersey.....	0	1	5	6	39,277	1,386	2,773
Pennsylvania.....	82	103	31	134	4,671,653	4,902,332	5,968,270
Maryland.....	2	2	2	4	130,901	124,285	106,377
Virginia.....	6	5	16	21			
Georgia.....	0	0	2	2	160,397	131,750	119,466
Texas.....	0	0	3	3			
Alabama.....	20	17	29	45	788,895	890,759	871,155
West Virginia.....	3	2	2	4	130,455	161,017	129,155
Kentucky.....	1	1	6	7	46,159	47,415	23,537
Tennessee.....	7	8	10	18	164,482	156,460	144,738
Ohio.....	43	48	25	73	2,739,517	2,569,087	3,285,511
Illinois.....	14	20	6	26	882,807	1,225,195	1,304,227
Indiana.....	7	10	0	10			
Michigan.....	2	2	1	3	542,193	624,044	808,258
Wisconsin.....	3	2	4	6			
Minnesota.....	0	1	0	1			
Missouri.....	0	0	1	1	226,431	221,643	195,903
Colorado.....	3	3	3	0			
Washington.....	0	0	1	1			
Total.....	206	242	153	395	*11,356,634	*11,784,662	*13,840,251

* Includes ferro-alloys made with coke and electricity, coke and natural gas, etc.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York.....	0	0	3	3			
New Jersey.....	0	0	1	1	149,227	80,348	65,657
Pennsylvania.....	6	3	19	22			
Total.....	6	3	23	26	149,227	80,348	65,657

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts.....	1	1	1	2	6,424	3,225	8,793
Connecticut.....	1	3	0	3			
New York.....	0	0	2	2			
Pennsylvania.....	3	2	5	7	1,952	1,561	1,846
Maryland.....	0	0	1	1	1,429	1,896	1,311
Virginia.....	1	1	3	4			
Alabama.....	2	2	2	4	20,900	11,657	16,357
Georgia.....	0	0	2	2			
Texas.....	0	0	1	1			
Kentucky.....	1	0	1	1	1,574	3,760	518
Tennessee.....	1	1	0	1			
Ohio.....	1	1	1	2	625	1,277	241
Michigan.....	6	8	4	12	98,232	62,652	107,927
Wisconsin.....	1	1	0	1			
Missouri.....	1	1	0	1			
Oregon.....	0	0	1	1	29,909	31,513	29,373
California.....	0	0	0	0			
Total.....	19	21	24	45	*161,135	*117,541	*166,366

* Includes small quantities of pig iron and ferro-alloys made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous.....	206	242	153	395	11,356,634	11,784,662	13,840,251
Anth. & anth. & coke	6	3	23	26	149,227	80,348	65,657
Charcoal.....	19	21	24	45	161,135	117,541	166,366
Total.....	231	266	200	466	11,666,996	11,982,551	14,072,274

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

Districts.		Blast Furnaces.			Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.)			
		In blast Dec. 31, 1911.	June 30, 1912.		First half of 1911.	Second half of 1911.	First half of 1912.	
			In.	Out.				Total.
Pennsylvania.	Lehigh Valley..	10	10	15	25	423,788	463,225	444,533
	Schuylkill " ..	9	11	7	18	375,973	346,292	427,482
	L. Susq. " ..	6	8	7	15	225,170	221,501	230,518
	Juniata " ..	2	2	5	7	51,518	42,106	61,329
	Allegheny Co.	35	43	4	47	2,488,508	2,627,934	3,074,961
	Shenango Valley	12	16	8	24	637,625	614,719	945,029
	Miscel. bitum..	14	16	4	20	618,298	666,903	850,075
	Charcoal ..	3	2	5	7	1,952	1,561	1,846
	Mahoning Val.	19	19	5	24	1,134,795	1,258,780	1,424,685
	Hocking " ..	0	0	1	1			
	Lake Counties.	10	13	4	17	827,976	749,552	938,232
	Miscel. bitum.	8	9	7	16	594,005	462,173	724,410
	H. R. bitum ..	6	7	8	15	182,741	98,582	198,184
	H. R. charcoal.	1	1	1	2	625	1,277	241

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON

New York.....	240,641	209,200	276,596
Pennsylvania.....	1,741,542	1,719,723	2,152,153
Maryland.....	130,901	124,285	106,377
Virginia, West Va., Kentucky, and Tenn.	173,284	197,202	138,216
Ohio.....	1,707,978	1,575,992	2,015,369
Illinois, Wisconsin, Colorado, and California	710,078	878,477	883,644
Total.....	4,704,424	4,704,879	5,572,355

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.....			
Lehigh Valley.....	91,720	82,267	101,542
Schuylkill Valley.....			
Lower Susquehanna Valley.....	44,932	42,373	41,802
Allegheny County.....	1,070,758	1,007,999	1,253,258
Shenango Valley.....			
Miscellaneous bituminous.....	534,132	587,084	755,551
Mahoning Valley.....	603,726	836,862	930,257
Lake Counties.....	478,229	383,802	571,205
Hanging Rock bituminous.....			
Miscellaneous bituminous.....	426,023	355,328	504,907
Ohio.....			

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey.....	158,293	163,472	167,275
Pennsylvania—Allegheny County.....	1,335,712	1,548,215	1,719,000
" Other counties.....	1,128,377	1,186,458	1,358,734
Virginia.....	178,012	267,880	334,848
Alabama.....			
Ohio.....	518,544	593,197	762,752
Indiana and Illinois.....	481,690	742,504	925,000
Michigan, Missouri, and Colorado.....	134,859	112,747	134,767
Total.....	3,935,487	4,584,533	5,405,376

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania.....	66,577	80,235	79,646
Illinois.....	11,018	26,888	13,515
Total.....	77,595	107,123	93,161

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1907 TO 1911.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.)				
	1907.	1908.	1909.	1910.	1911.
Massachusetts.....					
Connecticut.....	19,119	13,794	18,368	16,582	9,649
New York.....	1,659,752	1,019,495	1,733,675	1,938,407	1,562,756
New Jersey.....	373,189	225,372	294,474	264,781	40,663
Pennsylvania.....	11,348,549	6,987,191	10,918,824	11,272,323	9,807,073
Maryland.....	411,833	183,502	286,856	326,214	255,816
Virginia.....	478,771	320,468	301,134	444,976	293,642
Georgia.....					
Texas.....	55,825	24,345	26,072	14,725	1,200
Alabama.....	1,686,674	1,397,014	1,763,617	1,939,147	1,712,211
West Virginia.....	291,066	65,551	228,282	174,061	291,472
Kentucky.....	127,946	45,096	86,371	100,509	95,202
Tennessee.....	393,106	290,826	333,845	397,569	324,644
Ohio.....	5,250,687	2,861,325	5,551,545	5,782,112	5,310,506
Illinois.....	2,457,768	1,691,944	2,467,156	2,676,646	2,108,002
Indiana.....	436,507	348,066	964,280	1,250,103	1,163,932
Michigan.....					
Wisconsin.....	322,063	148,938	348,177	307,200	276,807
Minnesota.....					
Missouri.....					
Colorado.....	468,486	313,071	382,766	428,612	395,968
Washington.....					
California.....					
Total.....	25,781,361	15,936,018	25,795,471	27,303,567	23,649,547

The Moore & Scott Iron Works, San Francisco, Cal., has received an order from the Western Pacific Railway Company for a steel ferryboat to ply between Oakland and San Francisco. It will cost approximately \$300,000. The hull and decks will be of steel and the vessel will be provided with an extra number of watertight bulkheads, being

made as nearly unsinkable and fireproof as it is possible to build a vessel. It will be 230 ft. over all, 62 ft. 6 in. beam, and will have a molded depth of 19 ft. 6 in. It will be driven by twin screws at each end and will burn liquid fuel. It is to be ready for service in 10 months. The vessel will be built at the Moore & Scott shipyard.

Practicing Efficiency and Knowing Costs

Letter Written to a New England Manufacturer Regarding a Tendency to Confuse Cost-Keeping with Efficiency

BY HARRINGTON EMERSON.*

In the operation of any undertaking one may attain high efficiencies and know little about costs, or one may know all about costs and practice no efficiencies. Which is more important?

Examples Differentiating System and Efficiency

When I was manager of a glass works I occasionally took Sunday dinner with a French glass-blower. Such meals for flavor and savoriness I have never eaten anywhere before or since, not even in the best restaurants of Paris, London and New York. The wife who cooked and served the meals was a French peasant woman, unable either to read or write. Her husband gave her \$20 a month to run the table. She could scarcely count, so she would buy one thing at a time and pay for it, receive the package and change and then buy another item. She also had a garden full of marvelous vegetables and herbs. My! but she was efficient as to quality; she did not pay more than she ought in price nor did she buy table salt mixed with corn starch at 10 cents a pound when rock salt at 2 cents answered the purpose as well. My! but she was efficient as to quantity; she did not buy more than she needed nor did she ever use more than enough. This

peasant woman did not know anything about cost-keeping, but she was a born and trained manager, practicing that French thrift which has made the French nation one of the richest in the world.

I also knew a young American who had "system" on the brain. He subdivided his expenses under a great number of heads. He did not have a very large income—had to earn or beg or borrow it. He would pay any price that sellers asked, and he bought \$14 shoes when \$3 shoes would have answered. He had twice as many suits as he needed and he got very little use out of them. It was the same with food, with lodging and with travel. On trains he paid extra fares, took the drawing-room, but spent most of his time in the buffet car. My! but he was inefficient; paying more than he should for everything, using higher qualities, buying more, using more than he should. Yet his accounts were beautifully drawn up in blue and red and green inks as well as black.

Which quality is more important in running a plant, efficiency or system?—the efficiency of the Scotch, the Quakers, the Yankees and the Swiss, or the system that balances up United States expenditures to a cent, and spends in proportion to what it gets four times as much money as the Swiss Republic?

Subordinate Position for System

No doubt there are efficient French managers who know how to read and write and figure. No doubt there are systematic men who also practice efficiency, but the point I wish to make is that efficiency and system are

totally different and that efficiency is by far the more important of the two. If I knew that every part of a plant I was managing was being operated at 100 per cent, efficiency, detailed costs would be relatively unimportant. To know every cost, yet not know what the efficiency is, whether high or only 50 per cent., is as reckless as to run a steam boiler without safety valve or steam gauge, trusting that it will not blow up.

Efficiency is the relation between *what is* and *what ought to be*. To determine what actual costs are is a clerical task, but this helps very little if we do not know what costs ought to be. Also, even if we are told what costs ought to be, it requires all sorts of skill to attain the ideal.

We may be running a foundry in which our castings cost \$2.75 per 100 lb. We may know that in another foundry similar castings cost \$1.75 per 100 lb. In such cases it is very usual for the superintendent to blame the equipment, to assert that if he had a new foundry with new equipment he could undoubtedly surpass the rival. It is also quite usual for the owners to blame the superintendent or the equipment and to advocate a change. Nobody knowing where or why the losses occur, everybody blames

somebody or something else. If the where and the why are known, a thousand-dollar investment might cut the cost to \$1.75. If the facts and remedies are not known, the emotional expenditure of \$100,000 might run the cost up to \$3 per 100 lb. There is, therefore, a great difference between the relative importance of cost determinations (only a fraction of the efficiency principle

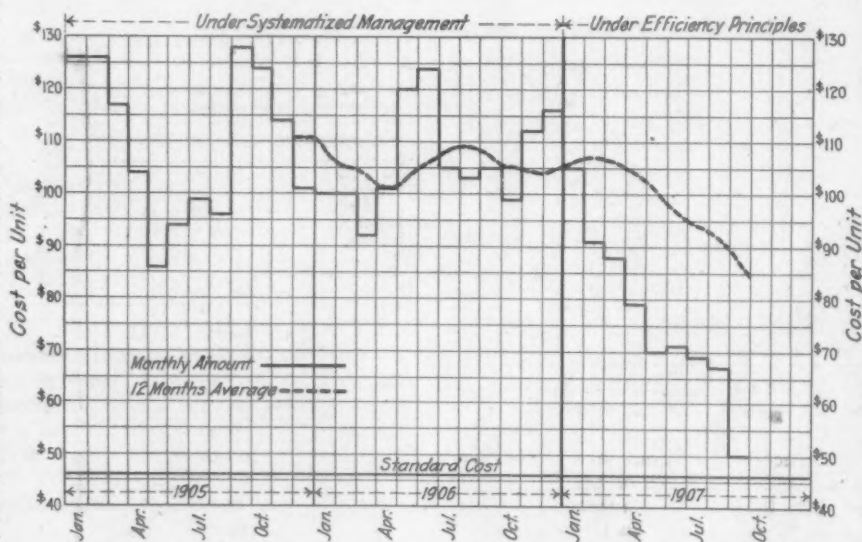


Diagram to Illustrate Cost Reductions Secured Under Efficiency Principles

ple of "Reliable, Immediate, Adequate and Permanent Records") and the skilled experience that can determine fair standards, and there is also a great difference between the analytical ability to determine fair standards and the executive ability and skill to attain them.

Establishing and Attaining Standards

To illustrate from horse-racing. The ancients 5000 years ago raced horses. Although it would have been very easy to have raced over a measured course and to have timed the speed by an hour-glass, a water clock, or by the beats of a pendulum regulated to an hour-glass, it does not seem that even these elementary records, corresponding to cost accounting, were applied until about 100 years ago. After 30 years of records as to trotting horses, one or two men who had given the subject lifelong practical study set the extreme achievement of the trotting horse at 2 min. It took 40 years more of intense refinement of track in shape and surface and banking, intense refinement of shoes and harness, intense refinement and improvement of sulky, intense and special skill on the part of driver as well as immense betterment in the physical welfare and training of the horse to realize 2 min. out of the most carefully and selectedly bred horse.

*President The Emerson Company, New York.

The following percentage estimates, based on experience in many industries, show the relative importance of cost records (requiring merely clerical fidelity and skill), efficiency standards (requiring the cooperation of engineers and scientists of many kinds) and of attainment of standards (requiring the highest executive skill):

Cost records	5 per cent.
Efficiency standards	30 per cent.
Attainment of standards	65 per cent.
Total	100 per cent.

The accompanying diagram illustrates plainly the difference between cost determination and efficiency achievement. It is an actual record of cost and efficiency work in a large plant. Cost records had been most voluminously maintained in exhaustive, expensive and useless detail for several years prior to 1907. For one of the items of expense in this plant the diagram shows the cost per unit, which in the most bewildering manner fluctuated between the extremes of \$86 in May, 1905, and \$128 in September, 1905. Each total was made up of several thousand items as to each of which a subsidiary but similar monthly record was made up.

The Procedure in an Actual Case

Without any connection whatever with the cost department, which was in fact intensely hostile, efficiency work was begun in January, 1907. Immediately and with a few men, preliminary standard costs were established, these individual standard costs summing up to a total of \$46 per unit. These preliminary standards were based on time and motion studies numerous and varied enough to establish the average current efficiency of the plant, for if a hundred well-selected tests show only 40 per cent. average efficiency, it is an impossibility that a thousand or ten thousand tests will vary much in either direction, either above or below the test average.

Efficiency depends almost wholly on the application of certain broad general principles. If these are lacking, it is as impossible to have high efficiency as to run an automobile 60 miles an hour up a rocky mountain side where there is no road. The cause of the inefficiency in this plant, in spite of elaborate cost records, was the failure to apply principles.

The measurement of the loss was determined by tests. Having on the strength of the tests and previous experience, boldly, but not rashly, established, a standard of \$46, less than one-half of the previous twelve months' average (\$105) and 46 per cent. below the previous lowest record of \$86, the next task was to bring up efficiency from 44 to 100 per cent., to bring down cost from \$105 to \$46 per unit. In going about this task none of the elaborately-kept records was of the slightest use except to record progress. They had no more influence on the result than a thermometer has on the weather or a stop-watch on the speed of an aeroplane. If there had been no cost records, efficiency would have gone up and costs come down just the same. If the records had not been kept by a hostile department on exactly the same plan as during previous years, few would have known and still fewer have admitted that any progress had been made. As the record shows, efficiencies increased and costs diminished steadily after the first month.

By September, 1907, efficiency had risen to 92 per cent., cost per unit had fallen from \$105 to \$50. In October, 1907, the panic occurred, the plants were almost closed and both records and efficiency work were suspended.

Summary

On account of the excessive expense and small returns cost accounting is viewed with disfavor by many executives. It adds considerably to overhead expense, which every manager and superintendent is ambitious to keep down. Also, so many records are often required from workers, from foremen, from superintendents, that they do not have enough time for their own work.

Efficiency work is not an overhead expense. It is a productive department whose motto is "Wealth from Waste." An efficiency department is inexcusable unless it yields in gain even the first year several times what it costs. If there is a big loss due to inefficiency, it may cost anywhere from \$5 to \$50 to rescue \$100. If the plant is a small one the percentage of cost to saving is naturally higher than if the plant is a large one, though an efficiency

scheme in its elements is essentially the same for the little plant as for the big one. Even if in a little plant an expenditure of \$50 yields only \$50 net profit, it is after all a remarkably productive investment.

The largest part of the value of the efficiency counselor is that he knows what not to do. If a chicken is put in a cage or maze from which it can only escape by taking one course out of a hundred, it will take it half a day of anxiety, of fluttering, before it accidentally strikes the right combination and gets out. If put back again it takes a shorter time to get out and finally by not taking the wrong paths it makes its way out in a few minutes. Its improved efficiency is due to the omission of mistakes.

Any one can open a tumbler lock if he knows the combination. If he does not know it, the chances against hitting it by accident are many and this alone constitutes the safety of the lock. So, too, in efficiency work, there are a score of things that must not be done for every one that must. It requires thorough knowledge of efficiency principles and long experience in their application to know what "not to do," and in knowing these pitfalls lies success in applying efficiency principles.

The United Steel Company's Improvements

The United Steel Company, Canton, Ohio, will make extensive additions to the buildings and equipment of its plant, work on which is now under way and will be completed about January 1. The extensions as planned will not add materially to the output of the plant, but are designed to round out various parts of it and make it as complete a plant of its kind as possible. However, with the completion of the additions the company will be able to produce a considerably larger tonnage of vanadium steel than at present.

The additions will include a new blooming mill engine, an extension to the blooming mill building, a new gas producer plant, additional blooming mill equipment, warehouses, etc. A 7500-hp. blooming mill engine will be installed by Mackintosh, Hemphill & Co., Pittsburgh. The plant will be shut down August 10 for the installation of this engine. A 300-ft. extension will be built to the blooming mill building. In this there will be installed a new bloom shear, which will cut up to 12 x 12-in. blooms. This shear and the tables in connection with it are being built by the United Engineering & Foundry Company, Pittsburgh. The blooming mill extension will be equipped with overhead cranes. The gas producer plant will contain 12 new producers, and is being built by the S. R. Smythe Company, general contractor, Pittsburgh. Other extensions will include a new vanadium steel warehouse for finished vanadium steel products, a new general storehouse and an addition to the vanadium steel heat treatment department. The company has just completed as a part of its extension plans a raw material yard, which is covered with runways and overhead cranes. The Kittie Boiler & Tank Company, Canton, has the contract for the steel work for the gas producer building.

Interesting Tests of a Reinforced Concrete Tank

Tests with fire and water were made some time ago of the reinforced concrete tank 5 x 5 ft. in size, with walls 3 in. thick, plastered on No. 24-gauge reinforcing material. The results were reported by Vice-Consul-General D. Milton Figart, Singapore, Straits Settlements, where the tests were made. Tests for deflection were first made with water and then after the tank was dry 160 gal. of kerosene oil was poured into the tank to a depth of about 12 in. After the oil had been burning 10 min. a 1/16 in. deflection was reported; 45 min. later the deflection was 1/16 in., and an hour later 3/8 in. The heat was intense and drove the spectators back. The deflection increased to 3/16 in. when the tank had been a mass of flames for exactly 2 hr. The oil burned for 3 hr. and when the fire had gone out the deflection recorded was 3/8 in. A few cracks were visible on the outer walls and the plaster had peeled in some places on the inside, but not a drop of oil escaped from the tank. After the fire the tank was filled with cold water and a few slight leaks were discovered, but the tank stood firm and did not collapse as was expected.

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CONTENTS.

Safeguarding Grinding Wheels.....	229
New Hand Milling Machine.....	233
An Ohio Blast Furnace Merger.....	233
Equipment of a Modern Gear Factory.....	235
Improved CO ₂ Meters.....	237
The Meaning of Memorials.....	237
Heavy Duty Cutting-Off Machine.....	238
The Tin Deposits in Alaska.....	239
Centrifugal Sump Pump.....	239
Multiple Keyshaft Grinding Machine.....	240
Banking Blast Furnaces in Elba.....	241
New Economy Hack Saw Machine.....	241
Phenomena in Rolling Fresh Steel Ingots.....	242
Spelter Production in 1911.....	242
The New Port Henry Blast Furnace.....	243
The Junkers Oil Engine.....	244
Adjustable Boring Bar.....	245
When Modern Machine Tools Fail to Save.....	246
Coal Production in 1911.....	247
A New Reflector for Industrial Lighting.....	247
The Campbell Cotter Pin.....	248
The General Electric Company's Large Dividend.....	248
Quick Change Engine Lathe.....	249
The Emerson-Brantingham Company Absorbs More Plants.....	249
A New Type of Floor Construction.....	250
A New Fire Extinguisher Sprinkler Head.....	250
Jones & Laughlin to Duplex.....	250
The Electric Truck.....	251
British Museum of Safety Appliances.....	251
Molding Machine Vibrator.....	251
The Rivett Lathe & Grinder Company.....	251
Combination Pattern Making Machine.....	252
Baltimore Business and Industrial Notes.....	253
Pig Iron Production for the Half Year.....	254
Petroleum Production in 1911.....	254
Practicing Efficiency and Knowing Costs.....	256
The United Steel Company's Improvements.....	257
Interesting Tests of a Reinforced Concrete Tank.....	257
He Thought He Had the Throttle, But He Only Had the Whistle.....	258
The Midsummer Pig Iron Statistics.....	259
The Spanish-American Machine Tool Market.....	259
Summer Vacations in the Shops.....	260
Fencing Industrial Properties.....	260
United States Steel Corporation's Earnings.....	261
Classifying Steel for Small Tools.....	261
The McKinley Memorial at Niles.....	261
Big Gun Making in Japan.....	261
The Iron and Metal Markets.....	262
Personal.....	273
Steel Tubes for the New Harlem River Tunnel.....	273
Obituary.....	274
Celebrating the Centennial of Gas Utilization.....	274
Papers for the International Testing Materials Congress.....	274
Machine Tool Research.....	276
Canadians Complain of American Scales.....	276
Minette Iron Ore.....	277
The Machinery Markets.....	277
Trade Publications.....	286

He Thought He Had the Throttle, But He Only Had the Whistle

Chairman Stanley of the committee which has been investigating the United States Steel Corporation, in grappling with the locomotive, thought he had hold of the throttle, but it proves to have been only the whistle. His investigations have made a terrific amount of noise, but the effect on the steel trade has not been what he had expected. During the investigation much stress was laid on the Gary dinners and the apparent attempt through the conferences of steel manufacturers thus held to control prices. It was the intention of Mr. Stanley and a number of other members of the committee to break down all efforts of steel manufacturers to co-operate with one another and thus to bring about unrestrained competition. These Congressmen undoubtedly believed that if steel manufacturers could be kept from conferring with one another by creating a hostile public sentiment to such meetings the effect would be a permanent era of low prices. It appeared for a time as if the committee might be measurably successful. A complete stop was put to the Gary dinners and no other general meetings of steel manufacturers have been held since the committee began its investigations. Perfectly open conditions have prevailed in the steel trade, with such sharp competition among manufacturers for business that prices fell to a level so low as to wipe out profits almost completely.

The era of low prices, probably much to the disgust of Mr. Stanley and his co-investigators, was, however, of comparatively short duration. Other influences, which even Congressmen could not check, so radically changed general business conditions that almost every week now sees an advance in some iron or steel product. The steel mills are so crowded with work that in important branches of the trade shipments are falling much behind and substantial premiums for prompt delivery are being paid to such mills as may be in position to meet a demand of this character. The condition has become so acute that able writers on trade matters are calling attention to the grave danger of a runaway market in steel products.

Thanks to Mr. Stanley and his associates, we now have no attempt at the regulation of prices. The United States Steel Corporation no longer maintains its old position in acting as a balance wheel to keep prices within reasonable bounds. In the past twelve-month we have seen the effect of independent action in depressing prices unduly, and we now witness the other extreme of independent action taking prices upward so fast that consumers are becoming scared. While much of the steel now entering into consumption has been purchased at low prices, quite a considerable proportion of the new purchases will represent a much higher rate through the payment of premiums. Consumers whose wants have not been covered can regard the Stanley committee as responsible in large part for the prices which they are obliged to pay. It is claimed that if manufacturers felt free to get together and discuss prices and market conditions openly and frankly, conservative counsels would prevail as to price advances. As matters now are, each manufacturer is keen to advance prices on the slightest provocation. He will make hay while the sun shines. Thus we have another illustration of the futility of attempts by legislators to direct or control trade conditions. The meddling of these people was at the

beginning regarded as tending to disturb trade seriously, but it was not expected that a practical demonstration would be made of this fact by the time that the committee made its report to the House of Representatives.

Now that the character of the findings of the committee has been made public, we can see what wide differences of opinion exist with regard to the United States Steel Corporation, its relations to the steel trade and anti-trust legislation in general. Far from a unanimous judgment has been arrived at, as the members have filed five different reports. These are composed of a regular Democratic majority report; a special report signed by Mr. Littleton of the majority; a principal minority report signed by two members, and two secondary minority reports signed by one member each.

The investigation has thus had a direct effect in bringing about chaotic conditions in the iron and steel trade, with no satisfactory conclusion regarding the particular object of the committee's investigation.

The Midsummer Pig Iron Statistics

In *The Iron Age* of June 27 a forecast was made of 29,000,000 tons of pig iron production for the current calendar year, the data used indicating that production in the first half would slightly exceed 14,000,000 tons. In connection with our June blast furnace report, published July 4, an estimate of first half production was made at "somewhat above 14,050,000 tons." The midsummer statistics compiled by the American Iron and Steel Association now show as the official production in the first half 14,072,274 tons of coke, anthracite and charcoal iron. Of this, 166,366 tons was charcoal iron.

To make a total production of 29,000,000 tons for the calendar year, in the light of 14,072,274 tons having been produced in the first half, and on the assumption that charcoal iron production, a small item in any event, will be the same in the second half as in the first half, a daily average production of 80,223 tons of coke and anthracite iron will be required in the 184 days in the second half of the year. This is a trifle less than 2 per cent. below the rate shown on July 1 by our latest blast furnace report. The prospects of the trade are clearly that production will average in the second half a higher rate than that shown on July 1, but it is not likely that the rate will be very much higher, on an average, for some ground is usually lost in July and August, and not infrequently in December, on account of weather conditions. For the calendar year the production to be 30,000,000 tons, instead of 29,000,000 tons, would require an average daily rate of 85,700 tons of coke and anthracite iron daily, or 5 per cent. in excess of the rate shown for July 1. This, while quite possible, is not probable as an average for the entire six months.

The feature of the pig iron statistics lately has been the fact that the steel works furnaces have been making considerably more pig iron than they did in the second half of 1909 and the first half of 1910, while the merchant furnaces have been making considerably less. The question has been discussed how this change in the alignment has been brought about. It could be by the demand for steel being greater than in the winter of 1909-10, the demand for foundry iron being less, or by the steel works using less merchant steel making

pig iron than before, or by a combination of both influences. The official statistics may now be consulted, to ascertain the distribution of production as to grades. These are as follows:

Pig Iron Production, First Half of 1910 and First Half of 1912.

	1910.	1912.
Bessemer	6,323,881	5,572,355
Basic	4,953,810	5,405,376
All other.....	3,734,701	3,094,543
Total	15,012,392	14,072,274

The decrease in the total production was 6 per cent. The decrease in steel making pig iron was 4.2 per cent., while the decrease in all other pig iron, chiefly ordinary foundry and malleable, was 17.0 per cent. Thus, since the production of steel making iron declined less, the proportion of steel making iron produced was greater in 1912 than in 1910. However, the steel works furnaces have shown less decrease than this, so that it is evident they drew less iron from the merchant furnaces than formerly.

While the decrease in steel making pig iron was 4.2 per cent., there was a decrease of 12 per cent. in Bessemer iron and an increase of 9.4 per cent. in basic iron. As the basic iron is normally used in connection with much scrap, it is evident that the production of steel, in proportion to pig iron, has been higher in the past six months than it was two years ago.

The Spanish-American Machine Tool Market

The majority of the larger machine tool builders in this country understand how to handle the European trade, but few of them realize the possibilities for business in South America and in other Spanish-speaking sections of the world. Spasmodic attempts to establish a footing have been made, both directly and through exporters. Quite a number have wasted money on salesmen who could order a meal in Spanish but who could not explain, in that language, the difference between a planer and a shaper. Others have entered into exclusive agency contracts with resident agents only to find out later that the second party to the contract was unreliable, some of them simply wanting to keep the manufacturer out of that particular market so that they could, unmolested, push a line of other machinery in which there was a larger profit.

A few experiences of this kind tend to discourage the average American manufacturer more than it does his foreign competitor, and as a result many excellent opportunities are overlooked. But flagrant mistakes are made by manufacturers themselves. As an instance, a Western firm recently received an inquiry for several machine tools from a large importing firm on the west coast of South America. Full information, in Spanish, was asked for; and prices were wanted delivered at port of destination, but, if that was not practicable, alongside steamer New York. Although unquestionable banking references were given, the manufacturer forwarded a catalogue printed in English that gave only very meager details, and in his letter, that was also written in English, he failed to give the gross and net shipping weights, cubic measurement of packages, while the prices named were f.o.b. cars at factory. It is needless to say that it would have been far better for this firm's future chances to have ignored the inquiry entirely than to have replied in such an unsatisfactory manner.

A worse example of the indifference of many Amer-

ican manufacturers to unknown export fields is that of a reliable importing house in Manila, P. I., which had a call for a lot of machinery from one of its regular customers. This firm wrote to an American machinery manufacturer, for whom it had been appointed sales agent in that territory, and laid particular stress on the necessity of receiving full information by return mail, calling attention to the fact that it took three or four months to ask a question and receive a reply. Although this correspondence was in English, the manufacturer only answered the importer's specific inquiries, overlooking many important details that needed explanation, and naturally the order went to a competitor who was able to give full information with his bid.

The average machine tool builder seems to think that an agent or customer should know as much about his machine or tool as he does himself. Then, too, he hesitates about taking the responsibility of quoting a delivered price, often relying upon his customer to figure out his own freight costs, which, he should know, is much more easily done at the point of shipment than at destination.

While direct representation is undoubtedly the solution for obtaining a full share of the Spanish-American trade, the volume of business to be obtained is frequently not sufficient to justify this expenditure. A Central Western firm has partially solved the problem by issuing a folder for each of its machines, giving a comprehensive description in both English and Spanish, together with gross and net weights, cubic measurements, etc. This is a comparatively inexpensive idea, and has proved a very satisfactory one for both the firm's representatives and customers. In all of its letters this company also states plainly the time required for shipment, terms of payment and the net price of any particular machine delivered wherever the customer wants it. In spite of the handicap of longer terms offered by European competitors, it has been able to build up an excellent export trade by its straightforward and thorough method of handling its correspondence.

Summer Vacations in the Shops

The summer vacation in manufacturing plants, that employees may have a rest from the routine of their labors, is a rapidly growing practice in New England. Manufacturers have found it profitable to shut down their works for this purpose, and many of them adhere to the custom even when business calls for the employment of every facility to meet the demands of the market. By midsummer most working people are pretty well fagged, and as their efficiency falls off correspondingly the vacation has a remarkably recuperative effect. Employees return to their labors after a week or two of rest or recreation with new vigor and ambition. In the meantime the owners have made necessary repairs and improvements; perhaps have rearranged old equipment and added new, and have done other work which can be accomplished to better advantage than when the works are in operation. The general health of the working force may naturally be expected to be better. The number of idle waste hours, the result of sickness or voluntary absence, is largely reduced.

The workman's side of the question is not so well understood. Vacation means the cutting off of his wages, when perhaps he would rather work, be-

cause he is in actual immediate need of the money, or because he does not realize that in the long run he is the gainer, physically, mentally and, in a great number of cases, financially. If the vacation is two weeks he does not get another pay envelope for three weeks, and in many works for four weeks, because one week's pay is held back. But with the mass of employees the year's earning power of the individual averages larger than would be the case were he to labor the whole 52 weeks, with holidays and Sundays only for his vacation.

An iron molder states that he used to dislike the vacation because of its incident inconveniences, the economies which he had to exercise for the time being, if he chanced not to be forehanded. But he has learned that on returning to work his efficiency is much greater. On piece work he earns considerably more after the vacation than before, except in the first week, before his molding sand has had a chance to become tempered by use. The effects do not wear off for several months. In common with practically every man and woman who takes the vacation rest, he is given new vigor, which means a greater average daily wage, not only because his production is greater per day, but also because of the reduction of his liability to lost time through illness. Apparently the system works to the advantage both of the owner and of his men.

Fencing Industrial Properties

The fencing of manufacturing properties is becoming a more common practice, especially among those located in towns and in the outskirts of cities. The necessity of protecting property against the lawless element is almost imperative in some communities. Opportunity for theft from exposed material is quickly seized, and acts of wanton vandalism are altogether too prevalent, a condition which has been intensified by the change in character of the population. Without a barrier, which a fence imposes, the outdoor storage of fuel means a steady and even serious loss, notwithstanding the presence of a watchman. Anything that can be sold as junk disappears. In time of labor trouble, should it arise, the fence is a factor of safety, especially where police protection is inadequate. Arranged to be unscalable, with gates, including one at the entrance of the spur track from the railroad, a fence is held to constitute an excellent investment, the saving in property earning a good dividend on the money expended.

The owner of a very fine new plant makes another point, that a handsome encircling fence so adds to the appearance of a property that the effect upon passers-by is an important advertising influence, especially where the location is close to a railroad. To take a modern manufacturing works, with its surrounding undeveloped land commonly found in suburban neighborhoods that are given up to manufacturing, and fence it in is to effect a surprising change in appearance.

The Burden Iron Company, Troy, N. Y., is arranging for equipping its horse-shoe and rivet factory throughout with electric drive. In the power plant will be installed a 700 kva. Curtis turbo-generator, which will be excited by a 50 kw. exciter. The equipment includes one 3 kw., one 5 kw., three 15 kw., and three 20 kva. transformers and the necessary switchboard outfit. For driving the various machines in the shop 16 motors ranging from 3 to 100 hp. will be employed. The apparatus is being furnished and installed by the General Electric Company.

United States Steel Corporation's Earnings

Surplus for the June Quarter \$56,483

The statement of the earnings of the United States Steel Corporation and subsidiary companies for the quarter ended June 30, 1912, makes the following showing, as compared with the corresponding quarter of 1911:

	1912	1911
April	\$7,509,207	\$9,412,573
May	8,846,821	9,590,444
June	8,746,237	9,105,503
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants and interest on bonds of the subsidiary companies.....	25,102,265	28,108,520
Less charges and allowances for depreciation:		
Sinking funds on bonds of subsidiary companies and depreciation and extraordinary replacement funds....	5,075,119	6,268,680
Sinking funds on U. S. Steel Corporation bonds:		
Installments	1,012,500	1,012,500
Interest on bonds in sinking funds..	585,352	516,170
Net income	18,429,294	20,311,170
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding..	5,714,111	5,783,293
Balance	12,715,183	14,527,877
Deduct dividends for the quarter on stocks of the United States Steel Corporation:		
Preferred	6,304,919	6,304,919
Common	6,353,781	6,353,781
Surplus for the quarter.....	\$56,483	\$1,869,177

The total earnings for the quarter ended March 31, 1912, were \$17,826,973, and the deficit for the quarter after the payment of dividends was \$6,292,134. The earnings for the quarter ended December 31, 1911, were \$23,105,115, and the surplus for that quarter was \$89,638.

Classifying Steel for Small Tools

In a short paper before the recent meeting of Railway Tool Foremen, Chicago, A. Sterner discussed the classification of small size steel for small tools. He made three general divisions, as follows: 1, Tool room tools; 2, boiler room tools; 3, blacksmith shop tools. The tool room is regarded as handling only small tools which require machining. They are cutting tools as distinguished from the tools used in the blacksmith and boiler shop, which are subjected to vibration and heavy pressure. The tool room tools include taps, reamers, drills, milling cutters, threading dies, punches, forming tools, shear blades, etc. The classification of boiler and blacksmith shop tools, covers rivet snaps, bending tools, flue cutters, caulking tools, Prosser expanders, expanding pins, forging dies, etc.

For the tool room tools, what is termed the "Special Grade" by steel makers is specified, explaining the purpose for which the bar is to be used. For the boiler and blacksmith shops, the extra grade has been ordered except for beading tools and forging dies. Beading tool steel is ordered special and the forging die is regarded as ordinary tool steel. The object in explaining the purposes to which the tool steel is to be put is to let the manufacturer select the carbon content.

To prevent the steels from becoming mixed racks are employed, divided into a number of spaces for the various grades and carbon contents. The bars are painted and a different color is used for each grade. A stripe of the color is put on the bar for its entire length, but when the steel is annealed two stripes of paint are used. The advantage of the scheme is that no matter how small are the pieces of steel, the grade is known and whether or not it has been annealed. High-speed steel was not taken into consideration.

The McKinley Memorial at Niles

Prominent men in the iron and steel industry are included in the list of those who have contributed and are contributing to the McKinley memorial fund, the proceeds of which will be used to erect a fitting shaft to the memory of the martyred President at his birthplace in Niles, Ohio. Inauguration of the campaign for raising the fund took place on the evening of Thursday, July 25, at City Park, Niles, which comprises 10 acres, and which the city has donated to the McKinley Memorial Association. It was on this site that the little white schoolhouse stood in which President McKinley obtained his first instruction. Within a stone's throw is where the future President was born. It is significantly fitting that Joseph G. Butler, Jr., Youngstown, Ohio, originator of the movement to establish a memorial fund, presided over the meeting. As a boy Mr. Butler also went to the little school house with Mr. McKinley as a school mate.

Nightly campaigns are being held in Niles, the work of raising the funds radiating to all parts of the country and across the seas. Responses are liberal. One company well known in the iron and steel business has contributed \$1,000, the largest single donation. Some of those who have contributed are as follows: Joseph G. Butler, Jr.; Brier Hill Steel Company and other well-known industrial institutions of Youngstown; Judge E. H. Gary, chairman United States Steel Corporation; A. C. Dinkey, president Carnegie Steel Company; John A. Topping, chairman Republic Iron & Steel Company; W. A. Thomas, president Brier Hill Steel Company; McKeesport Tin Plate Company; E. A. S. Clarke, president Lackawanna Steel Company; Willis L. King, vice-president Jones & Laughlin Steel Company; Andrew Carnegie; John D. Rockefeller; Dan R. Hanna and L. C. Hanna, Cleveland; Senator Theodore E. Burton; Frank Mason, United States Consul at Paris; Myron T. Herrick, United States Ambassador to France; C. A. Carlisle, president Studebaker Corporation; Seth Low; J. G. Schmidlapp, Cincinnati; J. G. Milburn, Buffalo, at whose home Mr. McKinley died; Samuel and W. G. Mather, Cleveland; H. G. Dalton, Pickands, Mather & Co., Cleveland; John Gallagher, Youngstown; Frank S. Witherbee, New York City; W. A. Rogers, Buffalo.

Big Gun Making in Japan

A Japanese journal states that the construction of three big battleships, each of 28,000 tons, has just been started in Japan—one at Yokosuka to be named the Hiyei, one at the Kawasaki yard to be named the Harima, and one at the Mitsu Bishi yard to be named the Kirishima. The 14-in. guns to be mounted on these new battleships are also to be manufactured in Japan. The guns are to be made at the Japan Steel Foundry's works at Muroran, the breech-blocks and other important parts being made at the Kure Naval Arsenal. The proportion of home-made and foreign material used in building warships in Japan is getting more and more in favor of homemade materials. The principle of the navy department of building ships at home has now been placed on a firm foundation, and official convictions in regard to this principle have been strengthened by recent accomplishments.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, reports the receipt of an order from the Pacific Gas & Electric Company, San Francisco, Cal., of one 1000 kw., two-bearing, synchronous motor-generator set, consisting of one 1000 kw., 550-700 volts, 514 r.p.m. direct-current generator and one 1440 hp., 2300-4000 volts, three-phase, 60-cycle synchronous motor complete with switching equipment. It has also received an order for three 100 kw., 125 volts, 260 r.p.m. type Q direct-current generators to be installed in the Fort Pitt Hotel, Pittsburgh, driven by Bruce-McBeth engine.

The two open-hearth furnaces which the Lackawanna Steel Company is completing (making a total of 14 open-hearth furnaces at its plant) are expected to be ready for operation very shortly—one this week and the other about August 15. Plans are under way for further improvements to be made at the company's works at South Buffalo.

The Iron and Metal Markets

More Price Advances Large Inquiries for Rails for Next Year

Heavy Buying of Pig Iron

Rather convincing testimony to the large volume of new business is the continuous performance now going on in the advance of prices on steel products. Merchant steel pipe manufacturers most unexpectedly advanced their prices late last Wednesday afternoon one point or \$2 per ton. This makes a total of two points advance in merchant pipe on this movement since June 1. On the same day steel boiler tubes were advanced one point or about \$2 a ton, which followed a similar advance on May 21. It is expected that the manufacturers of wrought iron pipe will advance their prices as one maker has already announced such an intention. Other advances of the past week were \$1 per ton on cold rolled shafting, \$1 per ton on structural and boiler rivets and \$1 per ton on railroad spikes made to order. Bolts and nuts have also been marked higher. One of the leading steel bar manufacturers announces its price advanced \$1 per ton, while others are stated to be rapidly falling in line. Bar iron manufacturers, both East and West, are asking \$1 per ton more. Some of the premiums asked on other rolled products for early shipment are gradually solidifying into regular prices. It would not be surprising if minimum prices on plates, structural shapes and steel bars should shortly be marked up at least \$1 per ton. The foreign manufacturers of ferromanganese have advanced their prices \$2.50 per ton, making the price for delivery at Baltimore \$51.

A most interesting development is the appearance of large inquiries for steel rails from leading railroad companies for delivery next year. The rail mills are now crowded with work for delivery up to October this year with orders continually being received from railroad companies anxious to make renewals. The experience which the railroad companies have had this year has been such as to cause them to return to their old custom of placing orders long in advance of their requirements. Such a change will be a most agreeable one for the steel manufacturers, as the rail situation has by no means been to their liking for the past couple of years. Chicago reports about 30,000 tons of rails under consideration in that district for delivery this fall. The Brooklyn Rapid Transit Company is in the market for approximately 15,000 tons of rails for subway construction.

Large orders for steel plates and shapes have been placed by Eastern shipbuilders to cover requirements on vessel contracts. It is stated that one shipbuilder has bought 25,000 tons from two mills. Other vessels for which contracts have been placed with builders will require additional heavy quantities of steel. Fabricators of structural work are now quoting considerably higher prices, having evidently changed their policy of giving to their customers the advantage of plain material bought at comparatively low prices some time ago.

Heavy buying of pig iron has taken place in Western markets. St. Louis reports over 30,000 tons contracted for in the past week of which 20,000 tons was basic, going to a single consumer. The makers of malleable castings, whose business has been heavily increased by reason of the excellent crop prospects as well as the better demand for railroad equipment, have purchased good quantities of malleable Bessemer pig iron, the statement being made that one user has bought from 15,000 to 25,000 tons for delivery extending into the first half of next year. The disposition among pig iron consumers generally to cover for deliveries running into next year is becoming more pronounced. A large foundry interest at Pittsburgh has bought 20,000 tons of foundry iron for deliveries which begin this month and will run through the first quarter of 1913. Inquiries are out at Pittsburgh for large quantities of basic pig iron, one of which is for 15,000 tons a month beginning with August, while another is for 10,000 tons for delivery this year, of which 5000 tons may have been bought by this time. The price of Bessemer pig iron has advanced squarely to \$14.50 at Valley furnace. The price of Southern foundry pig iron is steadily growing stronger. There appears to be but a limited supply available at \$11.50, Birmingham, for No. 2, with important makers stating that \$12 is being obtained without difficulty for prompt shipment.

The coke situation now appears to have clarified to some extent. The Connellsville coke producers were unable to accomplish the object aimed at, which was the establishment of \$2.50 per net ton at oven for furnace coke for last half delivery, partly by reason of the furnace companies securing lower prices from West Virginia coke producers and partly through dissensions among their own number. The price at which contracts for furnace coke are now being made is \$2.25 at oven.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	July 31, 1912.	July 24, 1912.	June 26, 1912.	July 26, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$15.75	\$15.75	\$15.50	\$15.00
Foundry No. 2, Valley furnace	13.50	13.50	13.25	13.50
Foundry No. 2, Southern, Cincinnati	14.75	14.75	14.25	13.25
Foundry No. 2, Birmingham, Ala.	11.50	11.50	11.00	10.00
Foundry No. 2, at furnace, Chicago*	15.00	15.00	14.50	14.50
Basic, delivered, eastern Pa.	15.75	15.50	15.25	14.50
Basic, Valley furnace	13.50	13.50	13.25	13.00
Bessemer, Pittsburgh	15.40	15.15	15.15	15.90
Malleable Bessemer, Chicago	14.50	14.50	14.50	15.00
Gray forge, Pittsburgh	14.15	13.90	13.90	13.90
Lake Superior charcoal, Chicago	16.25	16.25	16.25	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	21.50	21.50	21.50	21.00
Open hearth billets, Pittsburgh	22.00	21.50	21.50	21.00
Forging billets, Pittsburgh	28.00	28.00	28.00	26.00
Open hearth billets, Philadelphia	24.40	24.40	23.40	23.40
Wire rods, Pittsburgh	25.00	25.00	25.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	14.00
Iron rails, Philadelphia	16.50	16.50	16.50	17.50
Car wheels, Chicago	13.50	13.50	14.00	12.50
Car wheels, Philadelphia	14.00	14.00	14.00	13.00
Heavy steel scrap, Pittsburgh	13.25	13.25	13.50	13.25
Heavy steel scrap, Chicago	11.50	11.50	11.75	10.50
Heavy steel scrap, Philadelphia	13.50	13.50	13.50	13.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel,

	July 31, 1912.	July 24, 1912.	June 26, 1912.	July 26, 1911.
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.32½	1.32½	1.30	1.27½
Iron bars, Pittsburgh.....	1.35	1.35	1.35	1.25
Iron bars, Chicago.....	1.40	1.35	1.27½	1.20
Steel bars, Pittsburgh.....	1.25	1.25	1.20	1.20
Steel bars, tidewater, New York	1.41	1.41	1.36	1.36
Tank plates, Pittsburgh.....	1.30	1.30	1.25	1.35
Tank plates, tidewater, New York	1.46	1.46	1.41	1.51
Beams, Pittsburgh.....	1.30	1.30	1.25	1.35
Beams, tidewater, New York....	1.46	1.46	1.41	1.51
Angles, Pittsburgh.....	1.30	1.30	1.25	1.35
Angles, tidewater, New York....	1.46	1.46	1.41	1.51
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.20	1.25
Skelp, sheared steel, Pittsburgh	1.30	1.30	1.25	1.35

Sheets, Nails and Wire,

	Cents.	Cents.	Cents.	Cents.
Per Pound to Largest Buyers:				
Sheets, black, No. 28, Pittsburgh	2.00	2.00	1.90	2.00
Wire nails, Pittsburgh.....	1.65	1.65	1.60	1.70
Cut nails, Pittsburgh.....	1.55	1.55	1.55	1.60
Fence wire, annealed, 0 to 9, Pgh.	1.45	1.45	1.40	1.50
Barb wire, galvanized, Pittsburgh	1.95	1.95	1.90	2.00

Coke, Connellsville,

	Cents.	Cents.	Cents.	Cents.
Per Net Ton at Oven:				
Furnace coke, prompt shipment.	\$2.25	\$2.20	\$2.10	\$1.50
Furnace coke, future delivery...	2.25	2.25	2.25	1.65
Foundry coke, prompt shipment.	2.40	2.40	2.40	1.85
Foundry coke, future delivery...	2.50	2.40	2.00	2.00

	Cents.	Cents.	Cents.	Cents.
Per Pound:				
Lake copper, New York.....	17.70	17.62½	17.75	12.75
Electrolytic copper, New York..	17.60	17.62½	17.62½	12.60
Spelter, St. Louis.....	7.10	7.20	6.95	5.60
Spelter, New York.....	7.25	7.35	7.10	5.80
Lead, St. Louis.....	4.57½	4.60	4.37½	4.45
Lead, New York.....	4.70	4.70	4.50	4.50
Tin, New York.....	45.50	43.75	48.15	42.00
Antimony, Hallett, New York..	8.00	7.87½	7.75	8.00

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6½ in. up to 100 in. wide, 1.30c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square ft., are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per square ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

	Cents per lb.
Extras.	
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$25. Fence wire, Nos. 0 to 9, per 100 lb., terms, 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.45; galvanized, \$1.75. Galvanized barb wire, to jobbers, \$1.95; painted, \$1.65. Wire nails to jobbers, \$1.65.

The following table gives the price to retail mer-

chants on wire in less than carloads, including the extras Nos. 10 to 16, which are added to the base price:

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.30c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.35 to 1.40
H-beams over 18 in.....	1.35 to 1.40
Angles over 6 in.....	1.35 to 1.40
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909.....	1.35 to 1.40
Tees, 3 in. and up.....	1.35 to 1.40
Zees, 3 in. and up.....	1.30 to 1.35
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909.	1.35 to 1.40
Deck beams and bulb angles.....	1.60 to 1.65
Hand rail tees.....	2.10 to 2.25
Checkered, trough and corrugated floor plates..	2.25 to 2.50

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 3 ft., inclusive.....	.25
Under 2 ft., to 1 ft., inclusive.....	.50
Under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

	Cents per lb.
Blue Annealed Sheets.	
Nos. 3 to 8.....	1.40
Nos. 9 and 10.....	1.45
Nos. 11 and 12.....	1.50
Nos. 13 and 14.....	1.55
Nos. 15 and 16.....	1.65

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12.....	1.65 to 1.70
Nos. 13 and 14.....	1.70 to 1.75
Nos. 15 and 16.....	1.75 to 1.80
Nos. 17 to 21.....	1.80 to 1.85
Nos. 22, 23 and 24.....	1.85 to 1.90
Nos. 25 and 26.....	1.90 to 1.95
No. 27.....	1.95 to 2.00
No. 28.....	2.00 to 2.05
No. 29.....	2.05 to 2.10
No. 30.....	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11.....	2.10 to 2.15
Nos. 12, 13 and 14.....	2.20 to 2.25
Nos. 15 and 16.....	2.35 to 2.40
Nos. 17 to 21.....	2.50 to 2.55
Nos. 22, 23 and 24.....	2.60 to 2.65
Nos. 25 and 26.....	2.80 to 2.85
No. 27.....	2.95 to 3.00
No. 28.....	3.10 to 3.15
No. 29.....	3.20 to 3.25
No. 30.....	3.40 to 3.45

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following:

Corrugated Roofing Sheets by Weight.

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., as announced by most of the leading sheet manufacturers, are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

	Gauges, cents per 100 lb.				
	29	25 to 28	19 to 24	12 to 18	
Painting.					
Regular or oiling.....	.15	.15	.10	.05	
Graphite, regular.....	.25	.15	.10	.10	
Forming.					
2, 2½, 3 and 5 in. corrugated	.05	.05	.05	.05	
2 V-crimped, without sticks..	.05	.05	.05	.05	
¾ to 1½ in. corrugated.....	.10	.10	.10	.10	
3 V-crimped, without sticks...	.10	.10	.10	.10	
Pressed standard seam, with cleats.....	.15	.15	.15	.15	
Plain roll roofing, with or without cleats.....	.15	.15	.15	.15	
Plain brick siding.....	.20	.20	.20	.20	
3-15 in. crimped.....	.20	.20	.20	.20	
Weatherboard siding.....	.25	.25	.25	.25	
Beaded ceiling.....	.25	.25	.25	.25	
Rock, face brick and stone siding.....	.25	.25	.25	.25	
Roll and cap roofing, with caps and cleats.....	.25	.25	.25	.25	
Roofing valley, 12 in. and wider.....	.25	.25	.25	.25	
Ridge roll and flashing (plain or corrugated).....	.65	.65	.65	.65	

Wrought Pipe.—The following are the jobbers' carload discounts (card weight) on the Pittsburgh basing card on steel pipe, in effect from July 24, 1912; black

iron pipe from June 15, 1912; galvanized iron pipe from June 15, 1912, one point greater being allowed on merchant weight:

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
3/8 and 1/2 in.	72	52	..	..
3/8 in.	73	63	68	52
1/2 in.	76	66	71	58
3/4 to 1 1/2 in.	79	71	74	63
2 to 3 in.	80	73	75	64

Lap Weld.

1 1/2 in. ....	..	..	69	58
2 in.	77	70	71	62
2 1/2 to 4 in.	79	72	73	65
4 1/2 to 6 in.	78	70	72	64
7 to 12 in.	76	66	70	60
13 to 15 in.	53	..	46	..

Plugged and Reamed.

1 to 1 1/2 in., butt weld.	77	69	72	61
2 to 3 in., butt weld.	78	71	73	62
2 in., lap weld.	75	68	69	60
2 1/2 to 4 in., lap weld.	77	70	71	63

Butt Weld, extra strong, plain ends, card weight.

3/8, 1/2, 3/4 in.	68	58	64	54
1/2 in.	73	67	69	62
3/4 to 1 1/2 in.	77	71	73	64
2 to 3 in.	78	72	74	65

Lap Weld, extra strong, plain ends, card weight.

1 1/2 in. ....	..	..	63	55
2 in.	74	68	70	62
2 1/2 to 4 in.	76	70	72	65
4 1/2 to 6 in.	75	69	71	64
7 to 8 in.	68	58	64	54
9 to 12 in.	63	53	59	49

Butt Weld, double extra strong, plain ends, card weight.

3/8 in.	63	57	59	51
1/2 to 1 1/2 in.	66	60	62	54
2 to 2 1/2 in.	68	62	64	56

Lap Weld, double extra strong, plain ends, card weight.

2 in.	64	58	60	51
2 1/2 to 4 in.	66	60	62	56
4 1/2 to 6 in.	65	59	61	55
7 to 8 in.	58	48	54	44

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		Standard Charcoal Iron.	
1 1/4 to 2 1/4 in.	63	1 1/2 in.	48
2 1/2 in.	65 1/2	1 3/4 to 2 1/4 in.	50
2 3/4 to 3 1/4 in.	70 1/2	2 1/2 in.	55
3 1/2 to 4 in.	73	2 3/4 to 3 1/4 in.	57 1/2
4 1/2 to 6 in.	65 1/2	3 1/2 to 5 in.	60
7 to 13 in.	63	Locomotive and steamship special grades bring higher prices.	

2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.

2 1/2 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Pittsburgh

PITTSBURGH, PA., July 31, 1912.

Specifications for practically all finished steel products continue to come in at a heavy rate, very much in excess of what is usually expected for July and August. In most cases specifications are approximately as large as they were in June, and occasionally they are heavier. Among the important finished steel products merchant bars are probably the most active, all the mills being in receipt of heavy specifications. For example, the Carnegie Steel Company in June and July has entered specifications for about 350,000 tons, almost half of this total having been in July. This indicates in a general way a heavier rate of specifying for July than for June, because in the closing days of June a large tonnage was booked against contracts about to expire, the specifications being forced, as otherwise the tonnage would have been canceled. On Monday the Republic Iron & Steel Company formally advanced its price on steel bars from 1.25c. to 1.30c. The other producers have not made a formal advance, but on a large proportion of the inquiry coming in they are quoting 1.30c.; particularly where early delivery is required, the earliest feasible being generally in five to seven weeks. It is probable that in a few days the steel bar market will be quotable at 1.30c. as a minimum. There is less pressure in specifications for plates and shapes, as they cannot so well be

stocked. Last week cold rolled shafting was advanced one point to 64 per cent. off list in carload lots, while on Saturday rivets were advanced \$1 a ton. Spike manufacturers are quoting 1.65c., or \$1 a ton advance, on standard railroad spikes where the railroad has an individual specification, although spikes to producers' specifications are still quoted at 1.60c.

Pig Iron.—The Westinghouse Air Brake Company has bought its supply of foundry and forge grades for the balance of this year, making purchases from a number of producers, for deliveries beginning this month and running in some cases through the first quarter of next year. The total quantity taken was about 20,000 tons, on the basis of \$13.50, at Valley furnace, for No. 2. The Standard Sanitary Mfg. Company has been quietly sounding the market with the view of buying about 5000 tons for fourth quarter delivery. There are a few smaller inquiries in the market for foundry iron, but on the whole the market is spotty, there being activity only at a few points, as so many men are away on vacations. There are tentative inquiries for a large tonnage of basic iron, one steel interest up the Monongahela River inquiring for 15,000 tons a month, beginning with August, while a large steel foundry interest is asking for 10,000 tons and a steel works in the Pittsburgh district is inquiring for 5000 tons. These interests are endeavoring to do \$13.50, Valley, or better, but quotations at this price are not freely made. Bessemer iron has been very quiet as to actual sales or formal inquiries, but the price has stiffened and nothing below \$14.50, Valley, is now quoted, an advance of 25c. There is a prospect that several of the large steel companies will buy Bessemer iron within the next fortnight, this following several purchases which the Steel Corporation has quietly made in the past few weeks. Such buying, as was the case with the similar buying in the summer of 1909, would undoubtedly act to advance the market very materially. We quote: Bessemer, \$14.50; basic, malleable Bessemer and No. 2 foundry, \$13.50; gray forge, \$13.25, all at Valley furnaces, the freight rate to the Pittsburgh district being 90c.

Steel Billets and Sheet Bars.—The disparity in the supply of Bessemer and open hearth steel has become still more pronounced. Mills having contracts to supply Bessemer billets and sheet bars are continually asking for specifications and are keeping their customers well supplied, while in open hearth, on the other hand, consumers as a rule cannot get enough and are therefore inquiring in the open market, with the result that prices for open hearth have advanced further and there is now a good sized spread between the two commodities. Even some of the largest consumers would buy additional tonnages of open hearth sheet bars and are continually inquiring in the open market, though as a rule they cannot pick up much material. There is also inquiry for sheet bars for fourth quarter, and while no prices have been openly named it is believed that occasional sales have been made for this delivery at advances over quotations for early delivery. Axle billets have become very scarce and are bringing almost as high prices as forging billets, which have also been stiffening, as the shortage of open hearth material applies to all descriptions. We quote for delivery in third quarter: Bessemer billets, \$21.50 to \$22; Bessemer sheet bars, \$21.75 to \$22; open hearth billets, \$22 to \$22.50; open hearth sheet bars, \$22.50 to \$23; axle billets, \$27; forging billets, for general forging purposes, \$28 to \$29, all f.o.b. cars, Pittsburgh or Youngstown mill.

Ferroalloys.—A large tonnage of ferromanganese was closed up on contract at \$48.50, Baltimore, before the advance to \$51 which occurred last week. The new price is made for the balance of this year and for first half of next year, and prompt deliveries are quoted at the same figure, although some of the sellers are short and cannot take on early tonnage. We quote prompt and forward at \$51, Baltimore, freight to Pittsburgh being \$1.95. We quote 50 per cent. ferrosilicon in lots up to 100 tons at \$72.50; over 100 tons to 600 tons, \$71.50, and over 600 tons, \$70.50, Pittsburgh. The lower grades are ruling at about \$20 for 10 per cent., \$21 for 11 per cent. and \$22 for 12 per cent., f.o.b. cars at Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots, 10c. per lb. in 2000-lb. lots and over, and 12 1/2c. per lb. in lots up to 2000 lb.

Wire Rods.—While there has been little buying the rod market has stiffened and several of the large makers will not sell at less than \$26. We quote Bessemer, open-hearth and chain rods, at \$25 to \$26, Pittsburgh.

Muck Bar.—The market for muck bar has become largely nominal, producers being so busy in their own finishing mills. We quote best grades of all-pig muck bar at \$30 to \$30.50, Pittsburgh.

Skelp.—Both iron and steel skelp are scarce and

prices are very firmly held, with some sellers practically out of the market. We quote grooved steel skelp at 1.25c.; sheared steel skelp at 1.30c.; grooved iron skelp, 1.65c. to 1.70c., and sheared iron skelp, 1.70c. to 1.75c., delivered buyer's mill in the Pittsburgh district.

Steel Rails.—Specifications for light rails have been particularly good since the advance reported last week, but new buying is relatively light on account of buyers having covered quite thoroughly. We quote splice bars at 1.50c. per lb., and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb., 1.34c.; 12 and 14-lb., 1.29c.; 16 and 20-lb., 1.24c.; 25, 30, 35, 40 and 45-lb., 1.10c., in carload lots, f.o.b. Pittsburgh.

Structural Material.—Fabricators are quoting higher prices on finished work, and in some cases are obtaining premiums over the regular basis, on small rush jobs. The structural mills are well filled, but are still able to make fairly good deliveries. Mills have begun to advance prices from 1.30c. to 1.35c. This week several of the mills have been quoting the higher price on ordinary business, stating, however, that in exceptional cases they would do 1.30c. It is evident that within a few days the market will be squarely on the basis of 1.35c.; meanwhile we quote 1.30c. to 1.35c. on beams and channels up to 15 in.

Plates.—It is believed that if prices are satisfactory the New York Central lines will buy perhaps 10,000 cars, a formal inquiry being now figured on for 1000 heavy steel gondolas of exceptional length for the Pittsburgh & Lake Erie, while other roads are expected also to buy within the next 30 days. As with structural shapes, some of the mills have started to quote 1.35c. on plates against ordinary inquiries, and it appears that the market has been lined up for another advance of \$1 a ton. Meanwhile we quote 1/4 in. and heavier plates at 1.30c. to 1.35c., Pittsburgh.

Steel Bars.—Formal announcement was made Monday on behalf of the Republic Iron & Steel Company that its price on steel bars was advanced from 1.25c. to 1.30c. Since then some of the mills have been quoting 1.30c. also, as regards ordinary business, though it is improbable that much if any buying could now be done at 1.25c. The spirit of the producers at the moment is clearly that of making an advance of \$1 a ton, and 1.30c. is likely to be the market within a day or two. Meanwhile we quote bars at 1.25c. to 1.30c. Specifications for steel bars are very heavy, and exceptionally so for this time of the year. For instance, the Carnegie Steel Company has booked, as already noted, a total of 350,000 tons of actual specifications in June and July, and while the July tonnage was a trifle below the June tonnage, the fact that a portion of the June tonnage was filed in the closing days of the month, to avoid cancellation, indicates that the tendency to specify was really stronger in July than in June.

Hoops and Bands.—There is some new buying in bands, but very little in hoops, as all buyers were well covered by contracts before the latest advance. Specifications are very satisfactory. The price of bands is advancing the same as is the price of merchant bars. We quote bands at 1.25c. to 1.30c., extras as per the steel bar card and hoops at 1.40c., f.o.b. Pittsburgh.

Sheets.—Specifications for sheets have been extremely heavy in the past month, undoubtedly the heaviest ever experienced in July, and buyers appear to be more interested now in the question of deliveries than in that of prices. The mills are running somewhat better this week, as most of the repair work has now been done. On new specifications deliveries of black and galvanized sheets can be made by the average mill in from six to eight weeks and on blue annealed sheets in from three to seven weeks. The mills able to make the quickest deliveries on blue annealed sheets are disposed to exact a premium above the 1.45c. price for the delivery, this price having been withdrawn by one or two of these mills in the past week. We quote black sheets, 28 gauge, at 2c. to 2.05c.; galvanized sheets, 28 gauge, at 3.05c. to 3.15c., and blue annealed sheets, 10 gauge, at 1.45c. to 1.50c.

Tin Plate.—The mills are falling somewhat behind in deliveries, as specifications continue to come in at a heavy rate. The demand for terne plate is particularly good. Many consumers who contracted at the beginning of the season are endeavoring to buy additional tonnages and are being asked a large advance over their original contract prices, though many of the mills will make such old customers a concession from the regular market, which is firm at \$3.50 for 100-lb. coke plates, Pittsburgh.

Bolts and Rivets.—Under date of Saturday, July 27, the rivet makers advanced prices \$1 a ton, following

reports for some time past that the market was in line for an advance of \$1 or \$2 a ton. Producers are well sold up for the next few weeks. We quote button head structural rivets at \$1.65 and cone head boiler rivets at \$1.75 per 100 lb., base, in carload lots, f.o.b. Pittsburgh. The advanced prices on bolts and nuts reported last week are being well held, and we quote: Coach and lag screws, 80 and 17 1/2 per cent. off; small carriage bolts, cut threads, 80 and 5 per cent. off; small carriage bolts, rolled threads, 80 and 10 per cent. off; large carriage bolts, 75 and 5 per cent. off; small machine bolts, rolled threads, 80 and 15 per cent. off; small machine bolts, cut threads, 80 and 10 per cent. off; large machine bolts, 75 and 10 per cent. off; square hot-pressed nuts, blank and tapped, \$6.20 off, and hexagon nuts, \$7 off. These prices are in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works.

Shafting.—Manufacturers of shafting last week put up prices about \$1 a ton, reducing discounts one point, and we now quote cold rolled shafting at 64 per cent. off list in carload lots and 59 per cent. off in less than carloads, delivered in base territory. Consumers are well covered at former prices for the current quarter, and some of the larger ones for fourth quarter also.

Spelter.—The spelter market has shown no material change in the past few days, but there is less talk of a scarcity for prompt delivery than there was a week ago. We quote the market at 7.17 1/2c. to 7.22 1/2c., delivered Pittsburgh, equal to 7.05c. to 7.10c., f.o.b. East St. Louis.

Railroad Spikes.—Quotations have been stiffening on spikes. The leading producers are now asking \$1 a ton higher for railroad spikes when made to a railroad's specification, although the old price is still done on desirable orders for spikes made according to the maker's standard. Small spikes are quotable \$1 a ton higher. We quote standard railroad spikes, base sizes, 5 1/2 x 9/16 in., at \$1.60 to \$1.65 and small railroad and boat spikes at \$1.70 to \$1.75 per 100 lb., f.o.b. Pittsburgh.

Wire Products.—Specifications against contracts for wire products are said to be improving, although the season is still a trifle early. It is predicted that the early fall movement will be heavy. The new prices, as recently advanced, are stated to be well held as regards new business. We quote wire nails at \$1.65; cut nails, \$1.55; galvanized barb wire, \$1.95; painted, \$1.65; annealed fence wire, \$1.45, and galvanized fence wire, \$1.75, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Steel.—Mills are doing a fair amount of new business, while deliveries on old contracts are regarded as entirely satisfactory. We quote: Iron finished tire, 1 1/2 x 3/4 in. and larger, 1.25c., base; under 3/4 in., 1.35c.; planished tire, 1.45c.; channel tire, 3/4, 7/8 and 1 in., 1.70c.; 1 1/8 in. and larger, 1.60c.; toe calk, 1.75c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.60c.; cutters shoes, tapered or bent, 2.20c.; spring steel, 1.80c.; machinery steel, smooth finish, 1.60c., all f.o.b. cars, Pittsburgh.

Merchant Pipe.—Reports of an advance in wrought iron pipe cannot be confirmed locally, except that one interest, which frequently maintains a higher list than others, has issued a new card carrying a one-point advance. While the majority of mills made an advance in June, when steel pipe was advanced, an important Eastern interest did not do so and until it advances to the Pittsburgh basis already quoted in these reports an advance in iron pipe is improbable. Specifications for steel pipe have been heavier since last week's advance of one point. This was announced by the leading interest late Wednesday afternoon, a few hours too late for publication, and followed the next day by other sellers. This makes a total of two points advance in merchant pipe in this movement, 6-in. and smaller having been advanced one point June 1, larger sizes July 1, and all sizes July 24. Oil country goods participated in the first advance, but not in the second, and a further advance in these is expected at any time.

Boiler Tubes.—Steel boiler tubes were advanced one point, or about \$2 a ton, late in the afternoon of July 24, following a similar advance on May 21. One or two of the makers of charcoal iron boiler tubes have also advanced prices one point.

Iron and Steel Scrap.—The market has been absolutely lifeless the past week, mills apparently being entirely unwilling to take on any material. Conditions present the sharpest contrast with those which prevail in finished steel products and the antithesis is the subject of much comment. None of the largest steel interests is in the market for heavy melting steel and demand from other sources is also light. Prices are partly nominal, but are not quotably changed, except that we advance prices on machine shop turnings 50c. a ton.

The embargo at the plant of the Pittsburgh Steel Company is still on and may not be removed for another week, but the embargo at the yard of Max Solomon is likely to come off at the close of this week. Dealers quote as follows, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$13.25 to \$13.50
No. 1 foundry cast	13.00 to 13.25
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	11.50 to 11.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	9.75 to 10.00
Low phosphorus melting stock	15.50 to 15.75
Iron car axles	22.50 to 22.75
Steel car axles	15.75 to 16.00
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.00 to 10.25
†Sheet bar crop ends	14.75 to 15.00
Old iron rails	15.75 to 16.00
No. 1 wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.00 to 11.25
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Coke.—Since the split which occurred in the ranks of sellers of Connellsville furnace coke there has been a moderate amount of selling at \$2.20 and \$2.25 for prompt shipment, and this has been sufficient to relieve the situation, so that there is now no coke pressing for shipping instructions and sellers feel in somewhat easier position. On both prompt and contract furnace coke there are quotations at \$2.25, but sellers apparently are not willing to let go much tonnage at this price, being convinced that with the strength shown in the general steel market it will be easy to realize higher prices later on. We quote: Prompt furnace, \$2.25; contract furnace, \$2.25; prompt foundry, \$2.40 to \$2.50; contract foundry, \$2.50 to \$2.75.

Chicago

CHICAGO, ILL., July 31, 1912.—(By Telegraph.)

While the mills continue to place on their books an unprecedented tonnage of new business for this season of the year, it is still difficult to estimate the orders that would be placed if it were at all possible to obtain materials required; in addition, mill outputs are being hampered by the scarcity of labor and of raw steel for rolling. The size of the premiums offered by customers, in some cases amounting to \$6 per ton, indicates the pressure in their needs. Producers are advancing prices in self defense and higher quotations are rumored for all of the principal finished products, while advances have already been made on cold rolled shafting, screws, bolts and similar products. About 30,000 tons of rails have been under consideration the past week, all of which have not yet been placed. The principal transactions in structural material were the contracts for 8100 tons for the United Verde Copper Company's smelter and 4300 tons for the Chicago, Milwaukee & St. Paul Railway. Prices for bar iron show further advances, and for the first time weakness seems to be entirely eliminated from the trade in sheets. The local pig iron market continues active, particularly with respect to local foundry and malleable Bessemer. The demand is general, while at the same time larger melters have been much interested in the market.

Rivets and Bolts.—Increasing business and firmer quotations obtain in this market in the matter of screws, bolts and nuts and discounts have been reduced. Higher prices are also spoken of for rivets. We quote as follows: Carriage bolts up to $\frac{3}{8}$ in. x 6 in., rolled thread, 80 and 12½; cut thread, 80 and 5; larger sizes, 75 and 5; machine bolts up to $\frac{3}{8}$ in. x 4 in., rolled thread, 80 and 17½; cut thread, 80 and 10; larger sizes, 75 and 10; coach screws, 80 and 17½; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, $\frac{3}{4}$ to 1½ in., 1.78c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Cast Iron Pipe.—The city of Cincinnati will award about 3700 tons of pipe to a foundry at Lynchburg, Va. The Canada Iron Corporation, of Montreal, will furnish 1500 tons of pipe for Winnipeg and that will also be in the market in the near future for about 25,000 tons of 36-in. pipe. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$27.50; 6 to 12-in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

Wire Products.—The large producers report a smart

revival of trade in wire products and the outlook is for a record breaking movement in July as a result of the heavy buying before prices were advanced. The retail trade shows no hesitancy in ordering for fall business. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.63; wire nails, \$1.83; painted barb wire, \$1.83 to \$1.88; galvanized, \$2.13; polished staples, \$1.88; galvanized, \$2.18, all Chicago.

(By Mail)

Pig Iron.—The general tone seems to have increased in strength. One local furnace interest has advanced its price for No. 2 foundry and malleable Bessemer to \$15.50 f.o.b. furnace, at which price some sales of malleable and 300 tons of foundry iron are reported. The general market, however, is still at the \$15 level though more firmly established on that basis than a week ago, as a result of the advancing prices in adjacent territory. There is little change in the Southern situation, with the prices of last week still prevailing. The demand is about the same, and while there have been rumors of inquiry for important tonnages actual purchases have been of a general character. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery on prompt shipments as follows:

Lake Superior charcoal	\$16.25 to \$16.75
Northern coke foundry, No. 1	15.50
Northern coke foundry, No. 2	15.00
Northern coke foundry, No. 3	14.50
Northern Scotch, No. 1	16.00 to 16.50
Southern coke, No. 1 foundry and No. 1 soft	16.35 to 16.85
Southern coke, No. 2 foundry and No. 2 soft	15.85 to 16.35
Southern coke, No. 3	15.35 to 15.85
Southern coke, No. 4	14.85 to 15.35
Southern gray forge	14.35 to 14.85
Southern mottled	13.85
Malleable Bessemer	14.50 to 15.00
Standard Bessemer	16.75
Basic	14.50 to 15.00
Jackson County and Kentucky silvery, 6 per cent.	17.40
Jackson County and Kentucky silvery, 8 per cent.	18.40
Jackson County and Kentucky silvery, 10 per cent.	19.40

Rails and Track Supplies.—An aggregate tonnage of rails of interesting proportions is under consideration in this market and a small portion is being placed with local mills where late deliveries are acceptable. We quote standard railroad spikes at 1.70c., base; track bolts with square nuts, 2.10c. to 2.15c., base, all in carload lots, Chicago; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—A fair demand is noted for structural shapes for both bridge and architectural requirements. The Chicago, Milwaukee & Puget Sound Railroad Company awarded a contract for 1715 tons to the Milwaukee Bridge Company and for 2600 tons to the American Bridge Company. The American Bridge Company also obtained the contract for 2013 tons for the Anaconda Copper Mining Company's smelter at Great Falls, Montana, 230 tons for a tramway for the same company at Butte, and 412 tons for pier 28 at San Francisco. Other awards included 314 tons to the Jackson Richter Iron Works for the University of Utah at Salt Lake City; 137 tons for the Cleveland-Cliffs Iron Company for its Imperial mine at Michigamme, Mich., and 112 tons for the Chicago, Burlington & Quincy Railroad Company. For fabricated work much better prices are now obtainable. We quote for plain shapes, mill shipment, Chicago delivery, 1.48c. and from store 1.80c.

Plates.—Miscellaneous plate business for consumption in this territory is being placed for the most part with Eastern steel companies. Plates for fabricated structural work, such as railroad bridges, continue to be in demand and both in specifications and new business the tonnage is unusually heavy for this time of the year. We quote for mill shipment, Chicago delivery, 1.48c. and from store 1.80c.

Bars.—The price of bar iron continues to mount and this market is now firmly entrenched on the basis of 1.40c. An offer of 1000 tons at 1.37½c. was declined by one mill, while subsequently placed at that figure it eliminated from this market all quotations below 1.40c. The soft steel bar situation is unchanged. We quote as follows: Bar iron, 1.40c.; hard steel bars, 1.35c.; soft steel bars, 1.43c., and from store, soft steel bars, 1.75c., Chicago.

Sheets.—A canvass of Western territory indicates not only that mills in general are not anxious for business but that full prices are being asked and concessions have generally disappeared. Store prices have been advanced in keeping with the firmness of mill quotations.

We quote, Chicago delivery, as follows: Carload lots, from mill, No. 28 black sheets, 2.18c. to 2.23c.; No. 28 galvanized, 3.28c. to 3.33c.; No. 10 blue annealed, 1.63c. Prices from store are: No. 10, 2c.; No. 12, 2.05c.; No. 28 black, 2.55c., and No. 28 galvanized, 3.65c.

Old Material.—The dullness of the local scrap market during the past few weeks has been brightened somewhat by the impressively prosperous outlook for finished material and mill products generally. There is still considerable congestion in the yards of smelters and the shortage of labor is curtailing output considerably. The actual movement of scrap into melters' yards is therefore still quiet and will probably improve rather gradually. At the same time a pressure toward higher prices is being exerted by traders and such railroad lists as are in the market will doubtless bring prices above market quotations. Railroad offerings now in the market, in addition to an Illinois Central Railroad list closing to-day, are 2300 tons from the Chicago, Rock Island & Pacific and 3000 tons from the Chicago & Northwestern. The Lake Shore & Michigan Southern and the Erie are also receiving bids. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$16.00 to \$16.50
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Shoveling steel	11.50 to 12.00
Steel axle turnings	9.50 to 10.00

Per Net Ton.	
Iron angles and splice bars	\$13.75 to \$14.25
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.25 to 11.75
Iron car axles	19.25 to 19.75
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	10.75 to 11.25
Cut forge	10.75 to 11.25
Steel knuckles and couplers	11.25 to 11.50
Steel springs	11.75 to 12.25
Locomotive tires, smooth	12.25 to 12.75
Machine shop turnings	7.00 to 7.25
Cast and mixed borings	6.25 to 6.50
No. 1 busheling	10.00 to 10.25
No. 2 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	10.00 to 10.25
Railroad malleable	11.75 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.00 to 9.25

Cleveland

CLEVELAND, OHIO, July 30, 1912.

Iron Ore.—Some selling of small quantities of Lake Superior ore is reported in this city, but despite exaggerated statements the total quantity amounts to about 200,000 tons. One ore concern sold a total of 175,000 tons, so that little has been sold by others. Some furnaces which will need small amounts of odds and ends for mixtures are inquiring for such supplies over next winter, but it is not expected that the total of such sales will reach a very large figure. Furnaces show little anxiety to close on even such inquiry as has been put out. We quote prices as follows: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; Old Range non-Bessemer, \$3.05; Mesaba non-Bessemer, \$2.85.

Finished Iron and Steel.—News of the advance in the price of steel bars by the Republic Iron & Steel Company was received here without surprise as it is generally understood that its Youngstown mills are well booked far into the last half. Most finished lines are firm, although there is some doubt expressed that all down-state sheet makers are maintaining the maximum quotation on black sheets. Nuts and bolt makers in this city are preparing to follow Pittsburgh makers in advancing prices on small carriage bolts, quotations having been withdrawn in some lines in preparation for a possible advance. The Cleveland office of the American Steel & Wire Company last week had the heaviest run of specifications in its history, the demand coming largely from bolt makers. City Architect W. S. Lougee announces that he will likely ask for bids on the proposed city hall project about August 15. The plans have been revised somewhat, but the changes apply almost altogether to the exterior construction and will not affect the amount of steel to be used, which will probably be 3700 tons. While local fabricators' shops are busy, there is no large steel business to come out immediately except the city hall. The present run of business indicates that a large quantity

of small order business is being done out of warehouse. We quote iron bars at 1.35c. to 1.40c., Cleveland mill. The demand for forging billets is quite active and we quote forging billets at \$29, Cleveland.

Pig Iron.—Signs of a revival of interest in the local pig iron market are appearing, following the chill given sellers by a sale recently by a local maker at about 75c. a ton under prevailing quotations. Some melters are even looking ahead into next year's requirements. One seller in this city is considering such business and made the statement that probably the present price of \$14 will be advanced \$1 a ton, this making the first quarter quotation \$15. However, it is not expected that first quarter business will come out for some time, yet the fact that consideration at all is being given it is significant of the better feeling among Cleveland pig iron makers. A local maker to-day announced that its price for No. 2 foundry iron has been advanced to the minimum of \$14 for delivery in Cleveland or at a distance, its order books being well filled for remainder of the year. This is an advance of 50 to 75c. a ton over the recent low price made by one local maker on 1000 tons for outside delivery. It is understood that this maker now entertains stronger ideas of price than when it made its last sale. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	\$15.15
Basic	\$13.75 to 14.00
Northern No. 2 foundry	13.75 to 14.00
Southern No. 2 foundry	15.60 to 16.10
Gray forge	13.25 to 13.50
Jackson Co. silvery, 8 per cent. silicon	17.55

Coke.—Some low price offers are being made to local blast furnace interests, and one has just bought a small quantity of spot coke at about \$2.20 at oven, while another large interest declares that it expects to have no difficulty in covering for immediate requirements at about \$2. Sales have been small and are largely confined to near deliveries.

Old Material.—The demand for steel-making scrap has increased and dealers are now facing a shortage in supply. The two local rolling mills running on scrap have again entered the market, while an inquiry was received this week from an Alliance buyer for a round tonnage. The quotation of heavy steel has been advanced, and dealers report sales at \$13. There is marked firmness displayed in other lines, higher quotations being made by dealers this week on No. 1 railroad wrought, No. 1 busheling and No. 1 cast. Dealers' prices, f. o. b. Cleveland, are as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$12.75 to \$13.00
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	12.50 to 13.00
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap	9.50 to 10.00

Per Net Ton.	
Iron car axles	\$18.50 to \$19.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	7.75 to 8.00
Steel axle turnings	8.50 to 8.75
No. 1 busheling	10.75 to 11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, July 31, 1912.—(By Telegraph.)

Pig Iron.—Inquiry is decidedly better and there is a growing disposition to cover for this year's requirements and quite a number have been asking for quotations for delivery for the first half of next year. Foundry iron is increasing steadily in demand and the consumption of steel making irons by the rolling mills is again about normal after the midsummer shutdown for repairs. Indiana furnishes several inquiries for foundry iron that include two 500-ton lots of Southern No. 2 for last half shipment. A southern Ohio manufacturer wants 500 tons of Northern No. 2 foundry. Numerous smaller inquiries and orders indicate that the melters are taking more interest in the market than for some time past. Prices have strengthened in both the Alabama and Hanging Rock districts. Although some Southern No. 2 foundry is offered at \$11.50, Birmingham basis, for the third quarter, several producers are asking \$11.75, and there are a few records of small sales at \$12 for the fourth quarter shipments. Northern iron is also seeking a higher level, and while \$13.50, Ironfon,

can be done for the third quarter, there are indications that producers in the Hanging Rock district will soon hold firm to \$14 at furnace, which is now almost a general quotation. There are quite a number of inquiries out for both Southern and Northern iron for delivery during the first half of next year, but the furnace interests have held back in quoting prices. Malleable is quiet, but a Central West company is expected soon to purchase 2000 tons for this year's delivery. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft....	\$15.00 to \$15.50
Southern coke, No. 2 foundry and 2 soft....	14.75 to 15.00
Southern coke, No. 3 foundry	14.25
Southern coke, No. 4 foundry	14.00
Southern gray forge	14.00
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Lake Superior coke, No. 1	14.95
Lake Superior coke, No. 2	14.70
Lake Superior coke, No. 3	14.45
Basic, Northern	14.45
Standard Southern car wheel	25.75 to 26.00
Lake Superior charcoal	16.75 to 17.25

(By Mail)

Coke.—There are so many current conflicting reports that it is hard to tell how the situation is in the Connellsville field. While a few brands of furnace coke can be bought as low as \$2.25 per net ton, at oven, in that district the leading producers are firm in their intention to get a better price and we quote on standard 48-hr. coke \$2.35 to \$2.50. Reports as to the scarcity of labor in all the coke producing districts are not without foundation and it is even predicted that a slightly higher level may be soon reached, especially on coke to be shipped during the summer months. There is no change in the Wise county field, and we continue previous quotations of \$2.10 to \$2.25 per net ton, at oven. Pocahontas operators are willing to take on business at \$2 to \$2.15 per net ton, at oven. Foundry coke continues in better demand and Connellsville prices range from \$2.50 to \$2.75, but Wise county and Pocahontas brands can be purchased all the way from 15c. to 25c. a ton below these figures.

Finished Material.—There is a continued demand for warehouse material, due to the delay in getting shipments promptly from the mills. Local warehouse prices have not been affected and steel bars are sold at 1.70c. to 1.75c. and structural material around 1.85c. Mill prices are firm at 1.25c. for steel bars and 1.30c. for structural material, Pittsburgh basis. There is a better demand for wire products, including nails.

Old Material.—There is some improvement all along the line, but the demand is not anywhere near normal. An expected resumption of activities with the mills in this section will materially aid the situation and local dealers are more hopeful than for some time past. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$9.00 to \$9.50
Old iron rails	12.75 to 13.25
Relaying rails, 50 lb. and up	20.00 to 21.00
Rerolling steel rails	11.00 to 11.50
Melting steel rails	10.00 to 10.50
Old car wheels	12.25 to 12.75

Per Net Ton.	
No. 1 railroad wrought	\$10.50 to \$11.00
Cast borings	6.25 to 6.75
Steel turnings	7.00 to 7.50
No. 1 cast scrap	10.75 to 11.75
Burnt scrap	7.50 to 8.00
Old iron axles	17.00 to 17.50
Locomotive tires (smooth inside)	11.75 to 12.25
Pipes and flues	7.00 to 7.50
Malleable scrap	8.50 to 9.00
Railroad tank and sheet scrap	6.50 to 7.00

Birmingham

BIRMINGHAM, ALA., July 29, 1912.

Pig Iron.—A rather uneventful week has passed. There was only one feature, which was the marking up of spot and fourth quarter iron by the only company having an appreciable quantity of pig iron on hand. The basis was advanced to \$12 for the remainder of the year, with the exception of \$11.75 for a certain quantity of one particular grade on the yards. The other makers were already on the \$12 basis for the remainder of the year, and that status is now universal. Two more stacks have gone into operation, making 20 in all on coke iron and two on charcoal in Alabama. The slight increase in production is not sufficient to affect the market. The home consumption is keeping up with

regularity. Brokers find it difficult to place orders of any kind. From their standpoint the situation is acute. One company disposed of 3000 tons during the week on the general basis of \$12 with some concessions to \$11.75 on a special grade of stored iron. Otherwise the deals were confined to small lots at \$12, no matter what the period of delivery. The company making the largest fourth-quarter sales recently reports practically nothing for the week. The iron makers seem content with prices and conditions and do not appear anxious to hurry the market to higher prices. General expectation is that \$12.50 will be the maximum reached in the fall. The home price could be raised above that, but the tendency is to let well enough alone. The strict differential of 25c. for the lower grades is maintained. Minimum prices, f. o. b. cars Birmingham, are as follows:

No. 1 foundry and No. 1 soft	\$12.00 to \$12.50
No. 2 foundry and No. 2 soft	11.75 to 12.00
No. 3 foundry	11.25 to 11.50
No. 4 foundry	10.75 to 11.00
Gray forge	10.50 to 10.75
Basic	11.00 to 11.50
Charcoal iron	22.50 to 23.00

Cast-Iron Pipe.—Movements of cast-iron pipe are reported as in excess of the make. The manufacturers are, therefore, not in a rush to take on more business. A respectable amount is, however, added to the order books straight along. All water pipe plants are busy and quotations have a tendency to advance, but they are still f.o.b. Birmingham plants as follows, per net ton, 4-in., \$24; 6 to 8-in., \$22; 10-in. and over, \$21.50.

Coal and Coke.—Coal is at the height of summer dullness, but even at that mines are doing well on orders for storage purposes, both for domestic and steam coal. Coke is firm at \$3.25 to \$3.75 per net ton at oven, with no Virginia coke in the market owing to freight rates and the price at Virginia ovens. The outlook for both coke and coal is good.

Old Material.—Light cast and machinery stock are in demand, but as a rule the old material market has not been more than quiet to steady. Stocks are slightly increasing, but the dealers are confident of ability to sell at an early date at good prices and hence will not change quotations, which are f. o. b. cars at dealers' yards as follows, per gross ton:

Wrought-iron car axles	\$15.00 to \$16.00
Old steel axles	13.50 to 14.50
Old iron rails	13.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00
No. 1 country wrought	8.50 to 9.00
No. 2 country wrought	8.00 to 8.50
No. 1 machinery	9.00 to 9.50
No. 1 steel	10.00 to 10.50
Tram car wheels	10.00 to 10.50
Standard car wheels	11.50 to 12.00
Light cast and stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., July 29, 1912.

The past week has been exceptionally active in all divisions. Buyers have apparently reached a point where the matter of price is of secondary consideration. Deliveries are all important. Sales have been heavy and there are indications of more to come. Collections are reported satisfactory.

Pig Iron.—There is an increasing tendency to complain of the deliveries being made by the furnaces, quite a number of which are reported to be behind. Buyers already contracted are urging anticipation of shipments. New sales have been large, the most important being one of 20,000 tons of basic to a single consumer. Other sales reported include one of 1500 tons of mixed grades of Southern, one of 500 tons of No. 2 Southern, one of 800 tons of Northern iron, while another representative not included in these figures, reports total sales of 7000 to 8000 tons about equally divided between Northern and Southern pig. Besides these there has been a large number of sales of small quantities, bringing the grand total to very handsome figures. There is quite a number of new inquiries, one of the most important being for 2000 to 4000 tons of malleable. In quotations there is decided strength in all grades, with a tendency to advance; in fact advices to-day are of intended advances in Northern iron and charcoal iron. The quotations maintaining here are \$12 for No. 2 Southern, Birmingham basis; \$14 for No. 2 Northern, Ironton basis; \$14 for basic; \$14 for malleable and \$14 to \$14.50 for charcoal iron.

Coke.—Movement has been large on specifications, but there has been very little new business, most of the consumers being covered by contracts made at the be-

ginning of the year. The quotation for foundry No. 2 is firm. By-product coke shows no change and comparatively little is moving.

Finished Iron and Steel.—There has been marked activity and sales in all divisions have been more than good. The run of orders of the smaller size has kept up and a considerable number of large sales has had a material effect on the market tone. In structural material the sales included 8000 tons to the Kansas City Structural Company for a smelter for the United Verde copper mine at Jerome, Ariz. Another was of 1800 tons to a Dallas concern to go into the new Busch building at that point. The minor sales have run up the aggregate very materially. The fabricators report plenty of work on hand and are taking freely to cover their requirements. Bars are moving rapidly and the wagon makers have become an active factor in the market since the condition of the crops has been accepted as excellent. Plates are harder than ever to get and premiums are being offered to get prompt shipment. Generally throughout the market the question of price has apparently been lost sight of in the effort to get the material. In standard section steel rails the new sales have included 500 tons to a lumber road, 6500 tons to the Kansas City Terminal and 5600 tons additional to the Frisco. There are still other propositions pending. Light rails have been in fair demand from the coal interests, which are preparing actively for the winter season, but the lumber lines are still out of the market. Track fastenings are hard to get and deliveries are more extended.

Old Material.—There has been a livening up of the scrap market during the week, due to increased demand from the steel mills which are buying rather freely, though the rolling mills are still largely out of the market. There is a very active demand for relaying rails and the price on these is well maintained at quotations. The differential between St. Louis and other markets is still making it profitable to ship scrap to other points. The only list out during the week was one of 1600 tons from the Rock Island, mostly for St. Louis delivery. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 ft.	9.50 to 10.00
Relaying rails, standard section, subject to inspection	23.00 to 23.50
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	10.00 to 10.50
Frogs, switches and guards cut apart	10.00 to 10.50
Per Net Ton.	
Iron fish plates	\$12.00 to \$12.50
Iron car axles	17.00 to 17.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Railway springs	9.50 to 10.00
Locomotive tires, smooth	11.50 to 12.00
No. 1 dealers' forge	8.00 to 8.50
Mixed borings	6.25 to 6.75
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.00 to 8.50
Pipes and flues	7.50 to 8.00
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.00 to 7.50

San Francisco

SAN FRANCISCO, CAL., July 23, 1912.

The local situation shows some improvement, distributive trade in all finished products being much heavier than a year ago, and most encouraging reports are received from such distributing points as Los Angeles and Sacramento. Merchants are buying on a fairly large scale, being compelled to anticipate future requirements to a greater extent than for several years, though specifications so far indicate a conservative attitude. Inquiries for structural material are increasing, and large construction work now in progress will require a heavy tonnage in several lines.

Bars.—Immediate requirements are fairly well supplied, but the prospect of slow deliveries is bringing out a good volume of new business in soft steel bars. Small consumers are again buying freely, and the jobbing movement is about up to that of last month. Orders have been placed for the largest local requirements of reinforcing bars, and new business consists mostly of small orders, though the aggregate tonnage is satisfactory, and some important sales are in prospect. A heavy tonnage will probably be required for projected harbor work at San Diego, Cal. Open-hearth reinforcing bars in carloads are quoted at 2.10c., rerolled material being offered slightly under this figure. Soft

steel bars in small lots, from store, San Francisco, are quoted at 2.30c., and iron at 2.20c.

Structural Material.—Most recent contracts are of little importance individually, but the aggregate tonnage is increasing. Local fabricators are figuring more small jobs than for several months, and expect to be fully occupied through the balance of the third quarter. Some more important work is in the market, the principal item being the St. Francis Hotel addition, which will require about 2,000 tons. Estimates have also been made on a pier at San Diego, Cal., to take about 2,000 tons. Dyer Bros. have several small jobs, including the dome of the Kahn building in Oakland and the Voorman hotel on Mission street, for immediate construction, and the Western Iron Works has the Nathan Dohrmann warehouse contract. The Sacramento arsenal contract is said to have been let. The Odd Fellows are preparing to put up a large building in Oakland, and estimates are being made on some harbor warehouses at Los Angeles.

Rails.—The July tonnage is well up to the average of recent months, with a good volume of small business and a few important orders. The principal business placed locally is from electric railways, which are buying both standard sections and grooved rails. More inquiries are in prospect, and a good movement is expected at least to the end of this quarter. There is some demand for relaying rails. Light rails are moving mostly in a small jobbing way, but the tonnage is well maintained.

Sheets.—Merchants and the largest consumers are fairly well covered for this quarter's requirements at the old prices, and the advance has had little effect here. Specifications, however, are large, as the small consuming demand is very strong all over the state, and deliveries are subject to increasing delay. The demand for riveted pipe is still an important feature, and local merchants are beginning to figure on the usual increase in demand for galvanized sheets about the beginning of the fourth quarter. The city of Los Angeles will receive bids July 29 for a lot of sheet steel, rivets, etc., for the San Francisquito power development.

Plates.—Requirements of coast shipbuilding plants are rather larger than last year, and a further increase is expected. Several new tank contracts have been let, the Indian Oil Company, Martinez, Cal., having placed an order for ten tanks with the Western Pipe & Steel Company at \$57,350, and the Sunset Construction Company having a contract for the Standard Oil plant at Olympia, Wash. A contract has also been let for a large gas holder at Pasadena, Cal. The jobbing trade in tank and flange steel is well maintained.

Merchant Pipe.—No new business of importance has developed in oil-country goods, but the local trade is active. Merchants report the largest movement for this season in several years. Specifications are beginning to come out fairly well, and will probably increase within the next few weeks, owing to delay in deliveries. Stocks are now fairly large, however, and buyers show considerable caution in providing for the future, though the mills are about 5 weeks behind, on the average, in deliveries.

Cast-Iron Pipe.—The tonnage continues moderate, business being very slow to develop on the various large projects under consideration. The only recent orders worth mentioning were about 1200 ft. of 6, 18 and 20-in. pipe for Tacoma, Wash., and 150 tons for Hood River, Ore. There is a good general demand for fire hydrants, gate valves and other supplies, and plans are under way for many municipal water-works projects.

Pig Iron.—Several part cargoes of English and Continental iron are now in transit for this port, but the amount sold cannot be learned at present. This foreign material is quoted at about \$22.50 to \$23 ex ship, to arrive. No large orders have been booked of late for Southern iron, the market being somewhat unsettled by the prospect of renewed importations, while there is no urgent demand in the foundry trade. The Han Yang furnace will soon be ready to resume operations, and arrangements are being made to bring part of the output to this market. The Noble Electric Steel Company will resume work shortly, but it has not yet been a factor of any importance, and is not likely to be for some time. No. 2 Southern iron is still offered at about \$22.

Old Material.—Aside from deliveries on old contracts, business is rather quiet, with plenty of material on the market. Prices stand about as before, quotations being as follows: Cast-iron scrap, per net ton, \$14; steel melting scrap, per gross ton, \$11.50; wrought scrap, per net ton, \$12.50 to \$15; rerolling rails, per net ton, \$11.

Foucar, Ray & Simon, steel merchants, are occupying their new brick warehouse at 512-516 Folsom street, San Francisco.

Boston

BOSTON, MASS., July 30, 1912.

Old Material.—The strength of the market is asserting itself in higher quotations which, while to a certain degree sentimental, have foundation in the figures which appear in contracts for future delivery. The quotations given below are of prices offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	\$10.75 to \$11.00
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron axles	18.50 to 19.00
Mixed shafting	13.00 to 13.50
No. 1 wrought and soft steel	10.00 to 10.50
Skeleton (bundled)	9.00 to 9.50
Wrought iron pipe	9.25 to 9.75
Cotton ties (bundled)	9.00 to 9.50
No. 2 light	4.50 to 5.00
Wrought turnings	7.25 to 7.75
Cast borings	6.75 to 7.00
Machinery, cast	12.50 to 13.00
Malleable	9.50 to 10.00
Grate bars	6.50 to 7.00
Stove plate	8.00 to 8.50
Cast iron car wheels	12.00 to 12.50

Buffalo

BUFFALO, N. Y., July 30, 1912.

Pig Iron.—Good inquiry is reported and an improvement in orders placed, with favorable prospects for a large volume of early fall business. Foundries tributary to this market are limited in their activities only by their inability to secure an adequate increase in the supply of labor desired. Notwithstanding this fact they are ordering out iron from the furnaces much faster than they anticipated when present contracts were placed. The underlying status of the market is one of great strength and prices are stiffening steadily. Orders are being booked at \$14.50 at the furnace for Nos. 1 and 2 X foundry. Sales from Buffalo district furnaces have probably aggregated 25,000 tons, of all grades, for the week, included in which were a good many carload and small lot orders for prompt shipment. We quote as follows, per gross ton, f. o. b. Buffalo:

No. 1 foundry	\$14.25 to \$14.75
No. 2 X foundry	14.00 to 14.50
No. 2 plain	14.00 to 14.25
No. 3 foundry	14.00
Gray forge	13.75 to 14.00
Malleable	14.25 to 14.75
Basic	14.25 to 14.75
Charcoal, according to brand and analysis	15.75 to 17.50

Finished Iron and Steel.—Business is coming in from consumers in large volume in all lines and mills are well filled with business to the end of the year. One interest announces that its books are entirely filled for the remainder of the year on bars and small shapes and its mills are running double turn. Attention is being given almost entirely to making deliveries on contracts rather than to the soliciting of new business. Some mills report bar deliveries are now behind from 12 to 15 weeks on many sizes and about the same on plates. On shapes they are still further behind in many instances. The recent price advances are being well maintained, with probabilities in favor of a further advance. One interest reports that for small miscellaneous orders, less than carload lots, it is charging from \$1 to \$3 per ton over Pittsburgh base prices. The price for cold-rolled steel shafting was advanced \$1 per ton the latter part of last week. The advance put into effect on wire products last week has been well received and a good volume of business is being taken at the new prices. Sentiment is optimistic as regards the development of an increasingly large business in the fall months and a probable further advance in prices. The sheet steel market is strong and active and a large amount of business is being placed at the full prices covered by the recent advance. There has also been some inquiry for and buying of sheet steel piling for the week. Rail orders are being received in good volume by the Lackawanna Steel Company and its rail mill is running double turn, with deliveries extended to October. In fabricated structural lines inquiry continues active and prices are becoming stronger. A

large number of building projects are developing right along and many small tonnage jobs are being taken from day to day. Canadian fabricators are flooded with work, the matter of price not exacting as much consideration as promptness in delivery and execution. Local contracts reported placed for the week are as follows: Steel for three additional buildings for the King Sewing Machine Company's plant, Buffalo, 300 tons, with the Lackawanna Bridge Company; addition to the plant of the Crosby Company, 710 tons, and addition to the building of the Buffalo News Company, 100 tons, with the Buffalo Structural Steel Company; U. S. Hame Company's factory addition, 200 tons, with the George Kellogg Structural Company, and a small tonnage for the W. A. Robb building, Buffalo, with the Buffalo Bridge Company. The Chas. F. Ernst Sons Iron Works is reported as being low bidder for the steel, 500 tons, for the Queen City Improvement Company's store and office building, Buffalo.

Old Material.—The week has developed more activity than the market has shown for some time. Local buyers seem more willing to make purchases and receive material on contract despite the fact that prices for most commodities have stiffened perceptibly. Quite liberal offers have also been received from outside points, particularly for heavy melting steel, railroad wrought and turnings and borings. We quote as follows, per gross ton, f. o. b. Buffalo:

Heavy melting steel	\$12.75 to \$13.25
Low phosphorus steel	15.75 to 16.25
No. 1 railroad wrought	13.50 to 14.00
No. 1 railroad and machinery cast scrap	13.00 to 13.75
Old steel axles	15.00 to 16.25
Old iron axles	21.00 to 21.50
Old car wheels	12.75 to 13.50
Railroad malleable	11.50 to 12.25
Boiler plate sheared	13.75 to 14.25
Locomotive grate bars	11.00 to 11.25
Wrought pipe	9.50 to 10.00
Tank iron	10.00 to 10.25
Wrought iron and soft steel turnings	8.25 to 8.75
Clean cast borings	7.50 to 8.00

The German Iron Market

Market Reports at Variance

BERLIN, July 18, 1912.

There is a lack of harmony in the iron trade reviews this week. Thus the Cologne Gazette begins its review in the following optimistic tone: "The most prominent feature in the situation remains the scarcity of material. There is a lack of pig iron, and still more of semi-finished steel, to meet the actual demands of the market. Especially in the latter are consumers embarrassed and hindered in their arrangements, and they can keep their export engagements only with difficulty." In quite a different tone writes the Rheinisch-Westfälische Zeitung, the leading newspaper of Essen, which says that "the market's attitude of reserve continues and has caused a small reduction in the volume of orders booked."

Even the latter authority, however, states that the feeling in the market has grown more confident, and that a limited new demand has sprung up recently. It goes on to add that the foreign demand continues but is not uniform, German products meeting with sharp Belgian competition in Holland. The same writer admits that dealers are offering bars at reduced prices, but says they are not doing any business, and that manufacturers are maintaining their prices, since they are still well employed and the calls for delivery are very brisk. It is further pointed out that manufacturers expect an active autumn business, and for this reason are refusing to make price concessions. This authority finally winds up its rather two-faced report by giving its judgment that the high-water mark in the present boom has now been reached. This latter statement had a rather depressing effect upon iron shares on the stock market today.

Silesian Mills Advance Bars and Bands

That the market still contains elements of strength is evident from the fact that Silesian mills have this week voted to raise steel bars and bands by 2.50 to 4 marks a ton. Foundries on the upper Rhine have also this week decided to follow the example of those in other districts by advancing castings by one mark per metric cwt. The firmness of outside markets continues to give encouragement to the German trade. At the end of last week Belgian export prices for angles, tees and bands were raised one shilling, f.o.b. Antwerp. Galvanized fence wire, however, lost 2s. 6d. From northern France a further advance of bars and bands by 5 francs has just been reported. The Russian situa-

tion continues most satisfactory; the mills in the southern part of the country are not able to meet the broadening demands of the market.

The controversy over the leasing of the remaining ore lands belonging to the Luxemburg Government has just taken a new turn. It had been reported some time ago that Thyssen seemed to have the best prospect of getting the lease, after having beaten all other bidders, but it is now reported that English works have put in a bid better by 50 francs a hectare per annum than Thyssen's bid.

New business in pig iron is quiet for home delivery, but the foreign market continues to buy actively. Calls for delivery of iron are very urgent.

Scarcity of Steel

The scarcity of semi-finished steel has already been mentioned. This is felt particularly on foreign orders, since English mills continue to call for material postponed in delivery by the great coal strike there last spring. The amount available has been somewhat increased through new mills coming into operation, but not in sufficient volume to relieve the situation. It is reported that the Steel Works Union is considering the question of counteracting the growing scarcity by restricting its export business, and that it will also discuss the advisability of wholly abolishing the export drawbacks, which were considerably reduced some time ago.

Steel rails continue to be bought actively by foreign markets. The mills have work ahead for a considerable time in heavy rails. The export demand for lighter rails is also very good. The demand for grooved rails has increased latterly. For some time calls for delivery of beams and other structural shapes have been unusually heavy; this applies to the foreign market as well. The demand from construction shops is so heavy that it cannot be met always on time. General commercial forms are scarce.

The bar steel section is quieter, dealers continuing to maintain a waiting attitude in expectation of easier prices later on. Calls for shipment, however, remain very brisk. From the Saar district it is reported that manufacturers are rejecting all orders for small lots and referring inquiries to dealers. It is added that business is being taken for the first quarter of 1913 at 117 to 119 marks, but that only a few transactions are being effected. Bars on new orders cannot be had there under three or four months. In wrought-iron bars business continues very active in the general trade, with prices firmly maintained at 143 marks for commercial forms. Superior qualities bring as much as 20 marks above that figure. Mills running on skelp and strips for tubemaking and other purposes have about sold out their capacity to the end of the year. The volume of orders for tubes and piping has been further increased, and prices are quite firm.

The home demand for wire rods is not so strong as for most other classes of material; the mills are still able to accommodate some business for the current quarter. The foreign market is an active buyer, and is calling urgently for shipment. There is a big business in wire nails, notwithstanding the prostration of the building trade in Germany. Within a month the price has risen to 14.50 to 15 marks under an increasing demand. Efforts are being made toward the organization of a trade combination.

The British Market Still Strong

Pig Iron Higher and Further Shipbuilding Activity

(By Cable.)

MIDDLESBROUGH, ENGLAND, July 31, 1912.

Ferromanganese for America has advanced \$2.50 a ton, or to \$51 c.i.f., Baltimore, equal to £9 12s. f.o.b. works. The general situation remains unchanged, consumption being maintained at the same high rate, though new purchases are less insistent. Semi-finished steel continues scarce. Pig iron stocks in Connal's stores have increased 2884 tons in the week to 298,257 tons. Hematite iron is particularly strong. The scattered speculative liquidation is readily absorbed by large dealers and higher prices are anticipated by makers. There are 75 fresh shipbuilding orders under negotiation at the Clyde yards. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 58s. 9d. against 58s. 2½d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 59s. 3d. against 58s. 9d. one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d.

German 2-in. billets, f.o.b. Antwerp, 100s.

German basic steel bars, f.o.b. Antwerp, £5 17s.

Steel bars, export, f.o.b. Clyde, £7 15s. to £7 17s. 6d.

Steel joists, 15-in. export, f.o.b. Hull or Grimsby, £7.

Steel ship plates, Scotch delivered local yard, £7 17s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 2s. 6d.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 7½d., October-December.

New York

NEW YORK, July 31, 1912.

Pig Iron.—Sales by Eastern furnacemen have neither been numerous nor large in this immediate district. Inquiries are few. The quiet condition of business is largely attributed to the time of year, as at this period in midsummer it is usual to experience a decided diminution in activity. It is between seasons, as the largest buyers have quite generally covered their requirements for the third quarter and some have contracted for what they may need in the fourth quarter. The smaller buyers come into the market, of course, as their necessities may impel them. Furnacemen report the receipt of numerous requests for more rapid deliveries, indicating that the melt is fully up to the expectations of those foundrymen who have already bought. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$16 to \$16.50; No. 2 X, \$15.75 to \$16.25; No. 2 plain, \$15.25 to \$15.50. Southern iron is quoted at \$16 for No. 1 foundry and \$15.75 for No. 2.

Finished Iron and Steel.—New business is nearly all made up of small orders, of which there is an unusually large number. It is practically all of the urgent class, coming from jobbers for miscellaneous material and from fabricators, who have had calls for small extensions and repair work. The week is not unlike recent weeks in the matter of price advances. Steel bars were advanced \$1 a ton July 29 by the Republic Iron & Steel Company, and another interest has advanced iron bars \$1 a ton. At this writing it is generally believed that other companies will quickly establish the same minimum. In the last week or ten days quite a number of contracts for the fourth quarter were closed at the 1.25c., Pittsburgh, basis, for steel bars, and whether or not there is much more of this sort of business yet to come may have some bearing on how quickly a price of 1.30c. for bars will become general. While new demand for structural material is practically solely that required to meet the needs of small fabricating shops, as stated, there does not appear to be the same indication that structural material will immediately assume the usual differential between bars and shapes, or be carried to 1.35c., Pittsburgh, however much such a price is justified, as compared with the new price for bars. In at least one case plain shapes have been for a few weeks at 1.35c., Pittsburgh, but it is admitted no business was taken at this price. The fact that plate mills of the East have been exceedingly busy of late has resulted in a more general asking of 1.35c., Pittsburgh, for plates, a price which was really established without regard to the movement in bars. There is no measurable reduction yet in the periods of delivery, but not so much is heard of the payment of premiums, or, rather, it may be that the total volume on which premiums have been paid has not been comparatively great, or it is possible that the premiums have occasionally been obtained under another designation, namely, early shipment out of stock which may have been temporarily replenished with fresh rolled material. Specifications on contracts appear still to keep up well, but there is some talk of an expectation that owing to the fact that specifying generally has been made at its possible maximum, requirements for the later terms of contracts will not require the same high percentage of specifying. Whether or not a lull occurs in specifying, it is expected that plates and shapes will easily be at 1.40c., Pittsburgh, before the end of the year. The advance in bar iron is to 1.30c., eastern Pennsylvania mill, selling for about 1.40c., New York. This advance is not out of line with the rise in the price of bolts and nuts, and is also to be accounted for in part by the fact that some of the bar iron mills have noted heavy increases in orders, due to cancellation of steel owing to slow shipments. No new large struc-

tural projects have appeared since last week, although two fair sized apartment house jobs are expected to become active in about two weeks and the New York Central has placed another inquiry in the market for 600 or 700 tons for the terminal area work, and W. R. Grace & Co. are to build an 800-ton structure for an office building in lower New York. Among contract awards in the structural line may be mentioned 800 tons for the New York Central Rome and Hudson branches, taken in part by the Pennsylvania Steel Company and in part by the Fort Pitt Bridge Company; 200 tons for the Market street bridge of the Boston & Maine, Lynn, Mass., awarded to the Phoenix Bridge Company, and reconstruction work of the Fourteenth street station of the Third avenue elevated line, New York, to Lewis F. Shoemaker & Co. In the railroad cars, new business is expected from the Canadian Pacific, which may take 1000 to 3000 cars; from the Lehigh Valley, which is considering 1000 cars; the Cold Blast Transportation Company, for 350 refrigerator cars; the Brooklyn Rapid Transit, for 100 low-body cars; the St. Louis, Troy & Eastern, for 100 coal cars, and the Escanaba & Lake Superior, for 100 flat cars. The Pressed Steel Car Company has taken considerable of the last car offerings, including 700 of the 100,000-lb. all-steel hopper cars for the Virginian Railroad, and 2000 steel-sheathed cars for the Grand Trunk. The St. Louis Car Company is to build 125 cars of the low-body type for the New York Railways, and the Lenoir Car Works is to build for the Southern Railroad 400 box, 150 automobile and 100 flat cars. Before the week is out awards may be expected on the 1200 cars for the Buffalo, Rochester & Pittsburgh and the 1000 automobile cars for the Pennsylvania Lines West. Quotations are: Steel bars, 1.46c.; plain structural material, 1.46c. to 1.51c.; plates, 1.51c.; bar iron, 1.37½c. to 1.42½c., all New York. Plain material from store, 1.85c. to 1.95c.

Cast-Iron Pipe.—For some time there has been a dearth of public lettings and at present none whatever is in sight in this immediate district. Expectations are entertained of considerable buying by New York City, but up to this time nothing definite has transpired in this direction. Pipe makers report a continuance of the unusual demand for pipe of small diameters. On such sizes prices are very firm. Pipe of large diameters, however, is neglected, orders for this class being comparatively rare. Prices of carload lots of 6-in. are coming to be generally quoted at \$22.50 to \$23 per net ton, tidewater. It would seem to be quite difficult now to secure any quantity at \$22.

Old Material.—While it has become easier for dealers to make sales, the market is still far from active. Consumers in need of stock appear to be willing to pay current prices, but practically no disposition is shown to contract for future requirements. The eastern Pennsylvania steel works are still prevented from running to capacity by the scarcity of labor, and this has some effect on their consumption of steel scrap. Foundries are doing but little in the market, although indications are favoring the better employment of foundry capacity in the near future. Dealers' quotations, per gross ton, New York and vicinity, are unchanged as follows:

Old girder and T rails for melting	\$11.00 to \$11.50
Heavy melting steel scrap	11.00 to 11.50
Relaying rails	20.50 to 21.00
Rerolling rails (nominal)	12.50 to 13.00
Iron car axles	20.50 to 21.00
Old steel car axles	15.00 to 15.50
No. 1 railroad wrought	13.25 to 13.75
Wrought-iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	10.75 to 11.25
Light iron	5.00 to 5.25
Cast borings	7.00 to 7.25
Wrought turnings	8.25 to 8.50
Wrought pipe	10.00 to 10.25
Old car wheels	13.00 to 13.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.25 to 8.50
Locomotive grate bars	8.75 to 9.25
Malleable cast	10.00 to 10.50

Ferroalloys.—With little business, after the recent heavy buying, 80 per cent. ferromanganese is firm at \$51, Baltimore, for any delivery. For spot there is little inquiry. Despite the good buying of a week or ten days ago, it is not believed that the large consumers then in the market have entirely covered their requirements for the first half of next year. There is little doing in 50 per cent. ferrosilicon, with prices unchanged at \$72.50, Pittsburgh, for carload lots.

The Scullin-Gallagher Steel Company, of St. Louis, has begun active work on the construction of an addition to its plant to cost \$25,000. The contract for the steel work was let some time ago, and it is expected to have the new section ready for use by October 1.

Metal Market

NEW YORK, July 31, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

Copper, New York.			Lead		Spelter		
July.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
25.....	17.70	17.60	44.15	4.70	4.60	7.30	7.15
26.....	17.70	17.60	44.70	4.70	4.60	7.30	7.15
27.....	17.70	17.60	.....	4.70	4.60	7.30	7.15
29.....	17.70	17.60	45.10	4.70	4.57½	7.25	7.10
30.....	17.70	17.60	45.25	4.70	4.57½	7.25	7.10
31.....	17.70	17.60	45.50	4.70	4.57½	7.25	7.10

Copper is dull, with prices firm though practically nominal. Tin, following good business last week, is quiet but strong. Lead shows a weaker tendency. Spelter is lower. All brands of antimony have been advanced.

New York

Copper.—A dull but firm market is the present situation in copper and has been more or less the case in the last seven days, although in the latter part of last week there was some activity as a result of resale lots being taken up at concessions from the price of the producers. The latter have not receded from their quotation of 17.75c. for both Lake and electrolytic, and it is said that last week there were actual sales at that price, of Lake in particular. The sale of considerably over 1,000,000 lb. of Lake is reported to have been made on Friday last at 17.75c. Resale copper is not easy to find. It is reported that the latter part of last week 17.62½c. was bid for any part of 2,000,000 lb. of electrolytic for September and October delivery, but that the offer was declined by an operator who held copper. The dull conditions have prevailed this week in London as well as in the domestic market. Copper can be purchased to-day at 17.60c. for electrolytic and 17.70c. for Lake, though not in excessive quantities. The price in London to-day is quoted at £77 16s. 3d. for spot and £78 for futures. The exports this month were only 24,652 tons.

Pig Tin.—In the latter part of last week a large business was done in tin, it being currently reported that the United States Steel Corporation was a heavy buyer in Singapore, London and New York and other purchasers were in the market as well. All of the buying was for future delivery and a feature of the market is that spot tin appears to be scarce again. Since the beginning of this week there has been little inquiry for either spot or futures, the supposition being that consumers are well covered for present needs. Two features of the tin market are important contributors tending to strengthen the situation, one being that the deliveries into consumption for July reached the large figure of 5150 tons, which is not a record but is exceptional. The sale of Banca tin, which took place to-day in Amsterdam, Holland, brought the high price of 125¼ guilders, equivalent to 45.87½c., c.i.f., New York. The price of tin to-day is quoted in New York at 45.50c. and in London at £205 10s. for spot and £203 for futures. The arrivals this month total 5226 tons and there is afloat 2128 tons.

Tin Plates.—There has been no change in the price of tin plates, which stands at \$3.74 for 100-lb. coke plates, with the mills demanding 10 to 12 weeks for new specifications. It is predicted that this year is going to be a good one for the canning business and in view of heavy demands expected to develop and the high price of tin that an advance in price may be expected.

Lead.—Lead is very quiet with the independent smelting companies making the market price. They quote 4.70c., New York, and 4.57½c., St. Louis, a price which might in some instances be shaded. The American Smelting & Refining Company holds to 4.75c., New York, and 4.67½c., St. Louis. In the New York market a fair quantity of resale metal can be had at 4.70c.

Spelter.—In the last week spelter has developed weakness and prices have come down to a more normal level. In New York 7.25c. is quoted against 7.10c. in St. Louis. Spelter was offered July 30 at 7.10c., St. Louis, but was not taken. The market is quiet.

Antimony.—All brands of antimony have advanced in price and to-day Cookson's is quoted at 8.60c., Halliwell's at 8c., Hungarian and Chinese grades at 8.75c., but the market is quiet at those prices. It is asserted that the only reason for the advances is sympathy with the higher prices of other metals.

Old Metals.—The demand continues in about the

same volume as last week. Selling quotations are without change as follows:

	Cents per lb.
Copper, heavy and crucible.....	16.00 to 16.25
Copper, heavy and wire	15.50 to 15.75
Copper, light and bottoms.....	14.00 to 14.25
Brass, heavy	10.00 to 10.25
Brass, light	8.25 to 8.50
Heavy machine composition	13.00 to 13.25
Clean brass turnings	9.50 to 9.75
Composition turnings	12.00 to 12.50
Lead, heavy	4.40
Lead, tea	4.15
Zinc, scrap	5.50

Chicago

JULY 30.—The Chicago metal market has been active the past week, particularly as regards copper and tin. While prices for the former are not quotably higher the position is very firm. Tin prices have again advanced. We quote as follows: Casting copper, 17.50c.; Lake, 17.75c. to 17.87½c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 46.25c.; small lots, 48c.; lead, desilverized, 4.65c. to 4.70c. for 50-ton lots; corroding, 4.40c. to 4.45c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.20c.; Cookson's antimony, 9c., and other grades, 8.50c. in small lots; sheet zinc is \$8.75 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 12.75c.; copper clips, 14c.; red brass, 12c.; yellow brass, 9.25c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 28.50c.; tinfoil, 33c.; block tin pipe, 41c.

St. Louis

JULY 29.—The tone to-day is a little easier than that prevailing last week, with the result that lead is quotable at 4.55c. to 4.60c. and spelter at 7c. to 7.10c. In tin the market is higher and strong at 44.60c. to 45.10c. Lake copper is better at 18.10c. and electrolytic 18c. Antimony is quiet at 8.60c. In the Joplin ore market there has been a continuance of the strength previously shown, and although two of the largest buyers were out of the market the price advanced, the highest bid being \$63.50 per ton on the 60 per cent. metal basis, on which basis the choicest lots commanded \$66.50. In calamine the best price paid was \$38, the basis being \$30 to \$32 for 40 per cent. ore. Lead ore was slightly stronger at \$60 to \$61. On miscellaneous scrap we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3.50c.; lead, 3.50c.; tinfoil, 31c.; pewter, 21c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, July 31, 1912.

Some interesting happenings have marked the course of the stock market since the publication of our last report. The feature of Wednesday of last week was a sharp advance in the stocks of the General Electric and Westinghouse Electric. This was explained the next day when announcement was made of a stock dividend of 30 per cent. by the General Electric. On Thursday quite a sharp advance took place in United States Steel common, which had receded to 69. On Friday some response to this advance occurred in Bethlehem, Republic and Lackawanna. Lackawanna stock touched 40½, which compares with the low price for the year, 29, made March 21. The stock market on subsequent days was exceedingly quiet, with little change. In many stocks there were no transactions. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Bald. Loco., com... 58½-58½	Pressed Steel, pref.....101½
Bald. Loco., pref...105¾-106¾	Railway Spgs., com. 34¾-36
Beth. Steel, com... 35-35½	Republic, com... 25½-26¾
Beth. Steel, pref... 66-67	Republic, pref... 84-84½
Can. com... 35½-36¾	Sloss, com... 55
Can. pref... 116½-117¾	Pipe, com... 18¾-19½
Car & Fdry., com... 57¾-59¾	U. S. Steel, com... 69-70½
Steel Foundries... 34½-35	U. S. Steel, pref... 112¾-112¾
Colorado Fuel... 30-31	Westinghouse Elec... 79½-82½
General Electric... 181¾-188½	Am. Ship, com... 47-48½
Gr. N. Ore Cert... 42-43¾	Am. Ship, pref... 102
Int. Harv., com... 119-121¼	Chic. Pneu. Tool... 50½-50½
Int. Harv., pref... 120	Cambria Steel... 44-44½
Int. Pump, pref... 79½-80	Lake Sup. Corp... 32½-33
Lackawanna Steel... 39-40¾	Pa. Steel, pref... 98-98½
Locomotive, com... 42½-43¼	Warwick... 10½
Locomotive, pref... 109	Crucible Steel, com. 16¾-18½
Nat. En. & St., com. 16-16¾	Crucible Steel, pref. 92-94½
Pressed Steel, com... 34¾-35¾	Harb. Wk. Ref., com. 44-45

Dividends Declared

The Pressed Steel Car Company, regular quarterly, 1¼ per cent. on the preferred stock, payable August 31.
The J. G. Brill Company, regular quarterly, 1¼ per cent. on the preferred stock, payable August 12.

The National Lead Company, regular quarterly, ¾ of 1 per cent. on the common stock, payable September 30, and 1¾ per cent. on the preferred stock, payable September 16.

The United States Steel Corporation, regular quarterly, 1¼ per cent. on the preferred, payable August 30, and 1¼ per cent. on the common stock, payable September 28.

Personal

Secretary James T. McCleary of the American Iron and Steel Institute, 30 Church street, New York, is enjoying a vacation in his home State, Minnesota, expecting to be in his office again about the middle of August.

Frederick Baldt, Jr., who has been connected with the Nelson Valve Company, Wyndmoor, Pa., has been appointed superintendent of the plant of the Keystone Steel Castings Company, Chester, Pa., effective August 1.

G. L. Bayley has been appointed chief mechanical and electrical engineer for the Panama-Pacific Exposition Company, San Francisco.

Henry Wick has been elected a director of the Youngstown Sheet & Tube Company, succeeding George D. Wick, who went down with the Titanic. Other directors were re-elected.

Charles Hansel, consulting engineer and expert in charge for the revaluation of railroads and canals of New Jersey, has been retained by the State of Michigan to make valuations of certain railroad properties in that State.

E. C. Schmeltzopf, head of the tool room department of the Gisholt Machine Company, Madison, Wis., who is spending his vacation in the East, is now in New York.

John R. Russel, treasurer Great Lakes Engineering Works, Detroit, Mich., who has been in Europe, has returned.

C. J. Nyquist, superintendent of the Jersey City shops of the Davis-Bournonville Company, manufacturer of oxy-acetylene welding and cutting apparatus, returned from Germany July 16. He visited several cities in Germany, Denmark and France, investigating the progress made with the process in those countries and was gratified to learn that in some fields of operation the process in this country has been used with greater effect than abroad. On the evening following his return the shop employees of the company gave a dinner for the superintendent at Myer's Hotel in Hoboken.

Charles F. Uebelacker, Charles N. Black and William von Phul have been admitted to partnership in the engineering firm of Ford, Bacon & Davis, 115 Broadway, New York City.

Dr. Robert H. Fernald, professor of mechanical engineering, Case School of Applied Science, Cleveland, Ohio, has been called to the chair of mechanical engineering in the University of Pennsylvania. His change has necessitated his resignation as president of the Cleveland Engineering Society. Albert J. Himes, engineer of grade elimination of the Nickel Plate Railroad, who has been vice-president of the society, succeeds Dr. Fernald as president.

James E. Pope, president of the New York Metal Exchange, has resigned and his resignation was accepted by the board of managers July 25. Vice-president A. B. Hall of the National Lead Company is now acting president of the Exchange.

Steel Tubes for the New Harlem River Tunnel.—The award for the construction of section 14 of the Lexington avenue subway extensions, New York City, has finally been made by the Public Service Commission to Arthur McMullen, of New Canaan, Conn., and Olaf Hoff. This section is one of the most important of the proposed extensions, since it includes steel tubes under the Harlem River. Under the contract, these tubes will be built by the Olaf Hoff process, which is the same as that used under the Detroit River. The amount of the contract is \$3,889,775.

Obituary

ISAAC MC HOSE, Reading, Pa., who was for many years a very prominent figure in the iron trade of eastern Pennsylvania, died July 24, aged 90 years. His first connection with the iron trade was as a builder of blast furnaces. He helped to build the first anthracite furnace erected by David Thomas and associates at Catasauqua, Pa., in 1839, and continued in that branch of business for 30 years. He afterward became interested in companies engaged in the manufacture of pig iron, and for a time was one of the owners of the Temple Iron Company. For some years he was engaged in the banking business and was a former president of the Reading Board of Trade.

GEORGE W. AVERY, Cleveland, Ohio, for many years prominent in the wholesale hardware trade, died July 25, aged 67 years. A bullet hole through his head and a rifle lying at his side indicated that he had committed suicide. He had been in poor health for over a year, having suffered a nervous breakdown. He was connected with the William Bingham Company, wholesale and retail hardware dealer, about 40 years, and recently, until the reorganization of that company last December, was its second vice-president. He was a director of the Standard Tool Company and Standard Welding Company, Cleveland.

ROBERT M. CUNLIFFE, Philadelphia, Pa., died suddenly July 26, aged 66 years. Up to about six years ago he was engaged in the foundry business, having a plant at Eleventh street and Washington avenue.

CHARLES A. KOCHENRATH, SR., Louisville, Ky., died July 25, aged 78 years. He was up to 12 years ago a manufacturer of files, having a plant at Floyd and Main streets, where he had made files for 45 years. He was born in Germany.

ALEXANDER NIEDRINGHAUS, St. Louis, Mo., superintendent of the rolling mill of the National Enameling & Stamping Company and president of the St. Louis Press Brick Company, a son of former Congressman F. G. Niedringhaus, died July 25, aged 49 years.

Celebrating the Centennial of Gas Utilization.—In celebration of the centenary of the utilization of gas from coal, *Illustrirte Zeitung*, Leipzig, Germany, has brought out a special issue of about 125 large pages with numerous illustrations in color. Besides a number of general articles of what may be called the relatively popular sort are generously illustrated articles devoted to the modern methods of handling coal in large quantities in docks and around plants; the use of various forms of retorts and other apparatus for gas works; the use of by-product coke ovens; the use of the Mannesmann steel pipe in the gas industry; the use of flexible metal tubing in gas lighting; blowers for gas lighting; gas distribution under pressure; the various uses of gas in the household; the use of gas in ballooning, and considerable on the manufacture of by-products. Quite a little space is given over to special patented developments and portraits are included of the leaders in the gas industry.

The Delta File Works, Philadelphia, Pa., is furnishing merchants with a new display sign in order that they may prominently bring to the attention of their customers the fact that they have this brand of files for sale. The sign is of heavy metal, 21½ in. long by 9¾ in. wide. It displays a 16-in. flat bastard file in actual size and color, diagonally through the center of the sign. To the left is the Delta trademark, while to the right is the "Wreath of Quality" used in connection with the trademark. Brilliant colors are used.

Eastern steel plants have been greatly handicapped of late by the scarcity of common labor. Employment agencies have been unable to supply the deficiency, and various plans for the obtaining of men have been developed. One of the most recent methods has been that of having representatives of the different plants visit men's religious meetings in Philadelphia, where a considerable number of men have been obtained. They have enlisted a number of workmen at meetings of the Inasmuch Mission in Philadelphia.

Papers for the International Testing Materials Congress

Supplementing the brief partial enumeration of papers to be read before the sixth congress of the International Association for Testing Materials in New York, September 2 to 7, given in these columns in the issues of May 2 and July 25, may be added the subjoined list. Altogether there will be about 170 foreign and 35 American papers presented. Some of the American papers and committee reports are as follows:—

Committee 53, Microscopic Constituents, giving definitions based on facts as to which all are agreed, supplemented with statements of theories.

Committee 24, Nomenclature of Iron and Steel, giving greater precision to certain definitions and proposing preliminary steps looking to the eventual removal of two serious anomalies which are temptations to fraud, by so narrowing the definitions of steel and cast iron that they shall for scientific uses exclude "blister steel" and "malleable cast iron."

A. S. Cushman, official report, "Paints for Metallic Structures." Under the electrolytic theory of rusting, the action on metals of various pigments is compared.

J. E. Howard, "Tests of Structures," a study of the behavior of material in structures by means of strain measurements with a micrometer strain-gauge.

P. H. Dudley, "Testing Rails for Elongation and Ductility of the Metal under the Manufacturers' Standard Drop Testing Machine." Results are available within a few hours after the ingots of a melt are teemed and subsequent melts on the same day can be improved accordingly.

M. H. Wickhorst, "American Research Work Concerning Steel Rails Being Conducted Jointly by the Railroads and Steel Manufacturers." Segregation, ductility, the drop test and the temperature of rolling have been investigated; deficient ductility found in certain parts of the rail section; drop test with the rail head down better to detect poor ductility than the drop test with the base down; temperature of rolling not found to have great influence of the rail.

J. J. Porter, "Typical Uses of Cast Iron in American Practice."

J. E. Howard, "Notes on Features Associated with the Tests of Steel Rails," enumerating the service, stresses, track conditions and metallurgical features which should be considered.

H. F. Moore, "The Physical Significance of the Elastic Limit," referring to the desirability of the establishment and use of a distinctive nomenclature.

Albert Sauveur, "Note on the Crystalline Growth of Ferrite Below Its Thermal Critical Range."

R. P. Devries, "The Relation of the Tensile Strength of Steel to Magnetic and Other Hardness Tests."

F. P. McKibben, "The Design, Equipment and Operation of University Testing Laboratories."

Richard Moldenke, "Commercial Tendencies in Malleable Iron Practice."

W. N. Kratzer & Co., structural steel and iron work, Pittsburgh, Pa., have recently closed a large number of contracts for such work. Among the most important are the following: Union Carbide Company, Niagara Falls, N. Y., transformer house, furnace building, four crane bridges, conveyor supports, electric locomotive house, extension to storehouse, charging floors and furnace platforms, all to be delivered, not erected; Grasselli Chemical Company, Cleveland, Ohio, new plant construction at Lockland, in Cincinnati district, consisting of furnace building, gas producer building, two bar trestles, boiler and power house and furnace engine room, all to be delivered and erected; steel work for Hotel Buchtel, Akron, Ohio; West Penn Traction Company, Connellsville, Pa., machine shop and paint shop; steel frame mill building for shipment to Porto Rico; United States Government, Manila, P. I., riveted steel column construction for boiler room, engine room, compressor room and pump room; Victor Talking Machine Company, Camden, N. J., steel work for addition to building No. 7.

The A. M. Byers Company, Pittsburgh, has increased its capital stock from \$1,000,000 to \$1,200,000.

The Philadelphia Iron Market

PHILADELPHIA, PA., July 30, 1912.

The matter of deliveries is becoming more and more a factor in finished products; quoted prices are named for reasonable shipments, but premiums are being asked and freely obtained for practically all classes of material when urgent delivery is involved. Specifications continue good and a very fair volume of new business is being entered. The aggregate of specifications and new orders coming to mills appears to grow slightly larger from week to week and difficulty is found in meeting promised deliveries. The shortage of labor is still a factor in mill operations. Billets are in very good demand and makers are being urged for deliveries. The pig iron markets are quiet, moderate sales of foundry iron being quoted at unchanged prices. Steel making grades have shown more movement, \$15.75, delivered, having been established for basic iron.

Pig Iron.—A somewhat better movement in low grade iron is noted. Delaware River cast iron pipe makers have closed for several fair size blocks as well as odd lots of off irons. Several 1000-ton lots have been closed by nearby buyers, while one up-state pipe foundry has taken several thousand tons. Virginia cast iron pipe makers have also been buyers of small lots of low grade iron. Northern low grade iron continues scarce and \$15 to \$15.25, delivered, Delaware River points, about represents the market, prices varying in accordance with analysis. The higher foundry grades have not been particularly active. Transactions have been largely confined to small prompt lots, few individual sales in excess of several hundred tons being reported. Sellers maintain prices firmly, standard brands of eastern Pennsylvania No. 2 X foundry commanding \$15.75, minimum, delivered in this vicinity. In a number of instances the usual differential between No. 2 X and No. 2 plain is no longer maintained, both grades being quoted at the same figure. Some producers are now quoting \$16, delivered, as a minimum for No. 2 X, and sales have been made at that basis. Higher prices are occasionally heard of, but usually confined to small lots by consumers who do not want to change the mixture. Virginia foundry has been rather quiet. Little standard analysis iron is available for prompt shipment; sales have, however, been made at \$13.50, furnace, for prompt No. 2 X iron. The same figure is generally quoted for fourth quarter shipment. Forge iron for rolling mill purposes continues quiet; quotations are nominal at \$15 to \$15.25, delivered here. A slightly better movement in the steel making grades is noted. An Eastern mill recently inquiring for 5000 tons of basic has closed for 3000 tons of standard analysis iron for fourth quarter at \$15.70 delivered. Some little testing of the market for fourth quarter basic is noted and the majority of the producers are holding at \$15.75 to \$16, delivered. Makers of low phosphorus iron are asking higher prices for standard analysis iron. While quotations at the basis of \$20, delivered here, are still out sales have been made in moderate lots at prices equivalent to \$20.25 and \$20.50, delivered here. While the general pig iron market is not active the tone is strong and the tendency to get prices on a trifle higher basis is pronounced. Producers are, as a rule, well sold up for near future delivery and are not forcing business. The following range of prices is named for standard brands for near future delivery in buyers yards in this vicinity:

Eastern Pennsylvania No. 2 X foundry.....	\$15.75 to \$16.00
Eastern Pennsylvania No. 2 plain.....	15.50 to 15.75
Virginia No. 2 X foundry.....	16.05 to 16.25
Virginia No. 2 plain.....	15.80 to 16.00
Gray forge	15.00 to 15.25
Basic	15.75 to 16.00
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—Following the advance in price of 80 per cent. ferromanganese to \$51, seaboard, for the remainder of this year and the first half of 1913, business has come to a temporary standstill. Offerings at \$48.50 have recently been freely made by consumers, but have been generally refused by foreign makers. No sales have been reported in this district at the new price basis. Little demand for ferrosilicon is reported.

Billets.—A very satisfactory demand for both rolling and forging billets is noted. Eastern mills have entered pending contracts for rolling billets for last half delivery, in instances in 1000-ton lots, at current prices. Both orders and specifications are coming in freely and customers are urging mills for shipments. On prompt deliveries premiums of several dollars a ton are being paid. For ordinary deliveries \$24.40 to \$25.40 is quoted for soft basic open hearth rolling billets, and \$29.40 minimum for ordinary forging billets, delivered in buyers' yards in this district.

Plates.—Eastern mills continue to receive a very good volume of new business, mostly for moderate quantities. Specifications are, if anything, heavier, particularly for boat, locomotive and structural plates, and, as a rule, mills continue to fall behind on deliveries. Universal plates have been particularly active and some producers are fully covered for several months on this grade. A dollar advance, as a minimum, is usually quoted for universal plates. Premiums are still being paid for prompt deliveries, the advance ranging from \$1 to \$4 a ton, depending on the nature of the order, as well as the customer. Ordinary plates, $\frac{1}{4}$ in. and thicker, for reasonable delivery in this district are quoted at 1.45c. to 1.50c.; Universal plates, 1.50c. and upward.

Structural Material.—While several pending contracts for bridge work have been closed, including a contract for 1500 tons for a bridge near Oswego, N. Y., for the New York Central Railroad, taken by the Phoenix Bridge Company, new business of any size develops rather slowly. Fabricators are figuring on several fair size projects in the south, but in this district the bulk of the work offered is of the smaller class. Structural material mills are receiving good specifications against contracts and a fair run of miscellaneous orders and are making deliveries less promptly. On small prompt delivery orders \$1 to \$2 premium is asked. For ordinary deliveries quotations range from 1.45c. to 1.50c., delivered in this vicinity.

Sheets.—Orders on Eastern mills books are steadily increasing and satisfactory deliveries harder to make. New business has been larger, while specifications on orders have been quite heavy. Premiums of \$2 a ton are being paid in instances for spot deliveries. Deliveries on Western sheets are reported as being less prompt. Western No. 10 gauge sheets are quoted at 1.60c. to 1.65c., delivered here, while Eastern mills, making smooth, loose-rolled sheets easily obtain an advance of $\frac{1}{4}$ c. to $\frac{1}{2}$ c. per pound for ordinary deliveries.

Bars.—The market is stronger, although no very pronounced betterment in the demand is noted. A fair business has been done in steel bars at 1.40c., delivered here, and some sellers have advanced prices \$1 a ton. Iron bars are in fair demand, moderate business going at 1.32 $\frac{1}{2}$ c. minimum, for ordinary bars, delivered in this district. In instances makers hold at 1.35c., delivered. The full range of the market is from 1.32 $\frac{1}{2}$ c. to 1.37 $\frac{1}{2}$ c., delivered here.

Coke.—Notwithstanding easier conditions in the coke market, consumers of furnace coke are inclined to hold off awaiting further developments. Connellsville furnace coke for second half is reported available at \$2.30, ovens, and buyers believe considerably lower prices will ultimately be accepted. Moderate sales of foundry coke have been made at prices around \$2.40, ovens. The following range, per net ton, about represents the market for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$4.10 to \$4.70
Connellsville foundry coke	4.55 to 4.70
Mountain furnace coke	3.70 to 4.30
Mountain foundry coke	4.15 to 4.30

Old Material.—While there has been but little business moving, the market shows increased strength. Several of the Eastern consumers of heavy melting steel scrap show more interest in the market and round lots of this grade would bring \$14, delivered. One eastern steel mill has taken an aggregate of upward of 15,000 tons recently, at \$14 and \$13.75, delivered, depending on the size of the order placed. Odd lot sales of this grade of material continue, however, to be sold at \$13.50, delivered. A trifle better feeling is noted in rolling mill grades of scrap, but little business has been done. Holders of old material are not forcing business, holding for top prices, which consumers apparently are not yet ready to pay. Quotations are, to a large extent, nominal, the following range about representing the market for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap and crops.....	\$13.50 to \$14.00
Old steel rails, rerolling (nominal).....	14.75 to 15.25
Low phosphorus heavy melting steel scrap.....	16.50 to 17.00
Old steel axles	17.50 to 18.00
Old iron axles	24.00 to 25.00
Old iron rails (nominal).....	16.50 to 17.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal).....	7.00 to 7.50
Wrought turnings	10.50 to 11.00
Cast borings	9.75 to 10.00
Machinery cast	13.75 to 14.25
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal).....	12.00 to 12.50

Machine Tool Research

An Appeal for the Establishment of Definite Plans for Specializing on Machinery Design and Performance

BY CHARLES A. CARPENTER

Many branches of engineering have been pretty thoroughly searched for underlying laws and from scientific work undertaken to investigate certain classes of machinery, much knowledge has been gained concerning correct proportion, limiting conditions, losses, etc. The steam engine has been indicated, its heat action analyzed and the effect of many little factors has been determined. This research work has been so complete that engine guarantees based on drawing-room figures forerun the results of tests made on units later constructed without error sufficient to interfere with business. Similarly electric motors and generators have been investigated and their laws determined, permitting builders to guarantee horsepower efficiency, speed, heating, etc., from design computations. Many other illustrations might be given.

Research in the machine tool field has been of small volume in the form of published reports. Of course a large amount of investigation has been undertaken by builders, but knowledge so gained has been withheld from general distribution. Of the published data, the first impression is that the field of machine tool research has not been touched. The experiments seem to deal largely with shop work and not with investigation of the machines themselves. However, closer study shows that much has been accomplished, but the sifting and collation have not yet been attempted.

Outline for Study of Machinery

The writer in this article wishes to draw the attention to the desirability of such a careful collection of laws of machinery that some society or organization may take up the question. The following outline is suggested as a basis:

- (1) Analysis of machine tool parts to determine laws in force under operating conditions, analysis to include bearings of all types, best proportions, effects of lubricants, loads, efficiency, etc.—gears, belts, chains, etc.
- (2) Further investigation of cutting operations,—supplementing the work of Frederick W. Taylor, the Manchester School of Technology, etc.—applying the work to the several classes of machine tools.
- (3) The determination of the useful work done in machinery operations.
- (4) The determination of the power required to do the work.
- (5) The analysis of distribution of power so consumed, that is, separation into useful work, bearing losses, gear losses, cutting losses, etc.

With information along the above lines, new tools could be readily developed to incorporate advanced ideas in ball bearing construction, high grade gears, more efficient tool control, etc. The builder would gain as he would know just what his machines do with the power supplied. He would be better prepared to attempt slight changes for the better and could sell his goods on merit as regards speed, accuracy or handiness, without fear of arguments as to power losses, clumsiness, etc.

The buyer would gain considerable from the opportunity of laying out his shop for most efficient drive. He could estimate his load factor and power consumption, thus enabling him to provide the most efficient source of power. At the same time he would be in better position to decide the merits of various designs. The collaborated experiments would show what losses to expect in different tools and he could judge how much speed, accuracy and efficiency would affect his shop cost.

The operating man would also be largely benefited. Analysis of machinery as indicated in the outline would show the superintendent the best methods of doing certain work. The operator would get the benefit of this simplifying work and promoting speed of execution. At the same time better bearings, gears, etc., would reduce manual labor.

It may be argued that all this has been tried. The analysis of machine tools is very difficult and so results necessarily must be determined by individuals for specific

individual purposes. Of course there is truth in such statements, and machinery builders have done such research work. However, the problem frequently arises to estimate the size of a motor for a machine tool. In such cases the widely varying ideas prevalent are proofs of the desirability of further knowledge. More positive information on power consumption alone would be worth the effort spent to get the research work accomplished.

Examples of Lack of Knowing Machine Requirements

An example of discrepancies in ideas as to power required occurs to the writer. A plant planned to purchase four planers. A proposition prepared by a tool builder in conjunction with an electric concern called for four 25-hp. motors. A consulting electrical engineer with wide shop experience recommended one 40-hp. motor for the four machines. His recommendation was accepted and later was shown to be correct. If the machine tool research work had been accomplished as is the scientific work in the engine, turbine or motor field, the buyer, seller and electric man might all have reached a common basis correct within ordinary commercial errors.

The benefit of analysis concerning best types of bearings, gears, etc., can be seen from another illustration. A certain tool builder early realized the advantages of ball bearings. They were incorporated in a new design with other good features. Their application permitted the new machine to run at higher speeds than competitors' and the higher speed was of great advantage in the operations to be performed. Their use also reduced the power required, making belts used about half the size of the competitors'. The outcome was that the best trade was secured by this builder.

Other examples might be given, but it does not seem necessary. The advantages of more complete research work and broader dissemination of knowledge so secured are too evident. The writer hopes that some group of machinery men may make the start to develop the experimental and scientific side of the shop.

Canadians Complain of American Scales

A few days ago the Canadian Minister of Inland Revenue received a deputation of manufacturers of scales for weighing purposes. The deputation, which was introduced by Sam Barker, M. P., and T. J. Stewart, M. P., both of Hamilton, Ont., complained of the importation of inaccurate spring scales of American manufacture. The charge was made that these scales vary with the temperature as much as 5 oz. in 25 lb.; in extremely cold weather they cheat the buyer, in hot weather they cheat the seller. The manufacturers represented that if the department would prohibit the use of spring scales they would willingly abandon the making of them. As conditions are, they are compelled to manufacture them to protect themselves against American importation. The Minister promised to consider the proposal.

Minette Iron Ore.—The production of iron ore in the minette region of Lorraine, Luxemburg, and northern France for 1911 compares as follows with that of the year 1907, metric tons being used.

	1907	1911
Luxemburg	7,491,000	6,060,000
Lorraine	14,107,000	17,734,000
Briey plateau	4,126,000	6,200,000
Nancy district	1,916,000	2,051,000
Longwy district	2,196,000	2,350,000

The George M. Newhall Engineering Company, 1421 Chestnut street, Philadelphia, is in receipt of an order from the Pennsylvania Railroad Company for 10 wrecking cranes, 120 tons capacity each, with unusual features specified by the railroad company. The cranes are to be manufactured by the Industrial Works, Bay City, Mich. This is the first order for equipment of this character placed by the Pennsylvania Railroad Company for several years.

Representative Sulzer, of New York, has won over the support of the Democratic leaders in the House of Representatives for at least one battleship and assurances have been given that when the naval appropriations bill comes up next week the party will vote solidly in favor of the construction of one dreadnought.

The Machinery Markets

Assurances of satisfactory business in the machinery trade come from practically all parts of the country. The tone is exceptionally good for the season, and August is expected to develop excellent activity. Domestic business is helped out by well sustained exports, while the railroads continue to figure to an important extent. New York houses appear to be well satisfied and they agree that July has been a fairly busy month. Similar conditions have existed in New England, with foreign orders a feature, together with orders from automobile builders, while the Central Vermont Railway has issued a list calling for 38 tools. Philadelphia has experienced greater activity. In Baltimore trade has been better than in the previous month, and good export business is reported. In Cleveland July business exceeded that of June and there is considerable general inquiry pending. Cincinnati reports an improvement in the domestic demand for single tools, with the export business holding up well and an excellent outlook for August, despite a scarcity of labor. Satisfactory conditions have existed in Detroit, where new business is promising. St. Louis has been a little slow, although pending business will soon be closed. July has been satisfactory in the Central South, with the main call for woodworking machinery and the outlook good for August. In Birmingham there has been a steady demand for small tools, as well as for power and pumping equipment. In Texas conditions are good because of the many industrial projects afoot. The Pacific coast trade is receiving demands for lumber and logging equipment, but most of the railroad business in that section is going to Eastern bidders.

New York

NEW YORK, July 31, 1912.

Trade continues fair, with the general tone good, and some houses assert that they will be satisfied if the present activity continues until fall. Inquiries are plentiful. Railroad business continues to absorb a good part of the attention of machinery houses in the New York territory. Locally there is not a great deal stirring, but sales possibilities in several directions and at various distances from New York tend to keep traveling salesmen busy. From central and western New York it is reported by those who have covered the ground that several industrial plants are considering the buying of additional equipment. They are only fairly busy at the present time, but have confidence in the future. The Clark Bros. Company, Belmont, N. Y., maker of sawmill machinery, is continuing to buy against a list issued some time ago. It is reported that this company is intending to manufacture at least a part of its output in Olean, N. Y. Orders have been placed in the local market for a few machines, including a Gisholt turret lathe and several forging machines, by the Canadian Pacific Railway for its new Calgary shops. New York dealers are figuring on the list just announced by the Central Vermont Railway, which is given in the Cincinnati market. The anticipated Baltimore & Ohio list is in course of preparation, but probably will not appear for a few weeks. Some of the recently mentioned railroad business is yet to be closed. The Pennsylvania Railroad has several inquiries out for forging machines which is taken to mean that other requirements will be developed. The demand for second hand machinery is rather better than usual in New York. An indication of the trend of business since the first of the year is found in the complaints of salesmen that factory stocks are running low and they cannot always assure intending purchasers of early deliveries, and these conditions exist despite the fact that the plants have been running full time. Some of the middle Western manufacturers have been taking on all the good men they can get, and could use many more. In at least one machine tool plant some kinds of work have been entirely abandoned in order to concentrate on the tools for which there is the greatest demand and on which prompt deliveries cannot be promised. The stock lists of the first of the year in the cases of most plants showed more than enough machines to meet demands then anticipated.

The Baltimore & Ohio Railroad Company has awarded a contract to the Turner Construction Company, 11 Broadway, New York, for the erection of a nine-story and basement warehouse building, 67 x 352 ft., at Twenty-sixth street and Eleventh avenue, New York.

The American Hard Rubber Company, Brooklyn, N. Y., will erect a three-story brick factory building, 43 x 158 ft., with extension 28 x 95 ft., on Third avenue, between Third and Fifth streets.

Zinsser & Co., manufacturing chemists, Hastings-on-Hudson, N. Y., are having plans prepared for a new chemical plant which they will construct to replace the one recently destroyed by fire.

The Welte-Mignon Organ Company, Poughkeepsie, N. Y., is completing plans for a new plant which it will build this summer.

The State Hospital Commission, Capitol, Albany, N. Y., is receiving bids until August 7 for construction of sewage disposal works at the Kings Park State Hospital, Kings Park, N. Y. T. E. McCarr is secretary State Hospital Commission.

The General Electric Company is about to start work on the erection of a four-story factory building 30 x 67 ft. to be added to its plant at Schenectady.

In addition to the factory extension to be made to the Fulton County Silk Mills, Inc., Gloversville, N. Y., as mentioned in the last issue of *The Iron Age*, the company will build and equip a new boiler house.

The Clinton Mills Power Company, Cooperstown, N. Y., is having plans prepared for a power house, 30 x 50 ft., one story, which will it erect and equip this summer.

New bids are being taken for the Monroe County power house to be erected at Rochester. Thos. J. Bridges is chairman of the Commissioners of Public Buildings. All bids submitted July 15 were rejected.

The Rome Wire Company, Rome, N. Y., has taken bids for a power plant building 40 x 50 ft., one story, which it will build from plans prepared by Engineer C. Kiehm, Gardiner Building, Utica.

The Genesee Textile Company, Pike, N. Y., recently organized by Adam C. Friedrich and Julius C. Hoffman, will take over the plant, machinery and business of the Textile Specialty Company of that place and continue operations.

The Eagle Wagon Works, Auburn, N. Y., F. E. Swift, manager, is receiving bids for a forge shop 65 x 95 ft., one story brick and steel construction.

The Hall Automobile Coupler Company has been incorporated at Buffalo, N. Y., with a capital stock of \$250,000, and will engage in the manufacture of a patent hose coupler; for fire, steam and garden hose. Arrangements are being made for a manufacturing plant. The company's officers are: John W. Blackman, president; Lucius M. Hall, vice-president, and Edward S. Hall, secretary and treasurer.

The Rudolph Wurlitzer Musical Instrument Company, North Tonawanda, is completing plans for an extensive addition to be made to its plant, Martinsville Road and the New York Central Railroad, which will double its capacity.

The Foote Mfg. Company, manufacturer of concrete mixers and machinery, Nunda, N. Y., is arranging for the construction of a new plant to cost approximately \$50,000.

The City Council of Buffalo has authorized the Commissioner of Public Works, Francis G. Ward, to contract with the B. I. Crooker Company, Buffalo, for the reconstruction of the pumping station for the new water works system foot of Porter avenue, which collapsed June 30, 1911. The building is 100 x 370 ft., one story. The cost will be about \$150,000. The foundation walls and a portion of the former structure being

utilized. A valve house 350 ft. long will be built adjoining the pump house.

The Sanitary Can Company, of New York City, has had plans prepared for a factory building 128 x 251 ft., 2½ stories and basement, which it will erect at Niagara Falls, N. Y. The company's engineer, N. M. Lowry, 447 West Fourteenth street, New York City, is receiving bids.

Plans for the new plant of the Niagara Marine Gasoline Motor Company to be built at Dunkirk, N. Y., have been completed and construction work will soon be started. Upon completion the company will move from its present plant at Buffalo.

The Elmira Water, Light & Railroad Company has received permission from the Public Service Commission to issue bonds in the amount of \$201,000 for the purpose of making extensions to its water, electric and gas plants at Elmira and for contemplated improvements at its Montour Falls plant.

The city of Buffalo will erect a new brick power house and forge shop, adjoining the Vocational school on Peckham street, from plans of City Architect Howard L. Beck, Municipal Building.

The Rochester Pressed Steel Company was incorporated recently at Rochester, N. Y., with a capital stock of \$10,000 to manufacture articles of iron, steel and copper. W. H. and S. W. Gorsline and J. C. Dryer are the incorporators.

The Vacuum Oil Company, Olean, N. Y., is to make extensive additions to its plant; the cost of which, it is stated, will be about \$250,000.

The Lumen Bearing Company, Buffalo, N. Y., is adding a machine shop of reinforced construction to its plant at Sycamore street and the Belt Line.

New England

BOSTON, MASS., July 30, 1912.

General business is keeping up surprisingly well for the season, and the machinery trade as a whole is fairly good with local dealers and considerably better with the manufacturers because other sections of the country are buying more freely than New England and foreign orders are of satisfactory volume. The builders of automatics are rushed with business, with deliveries well into the future, but this excess of orders above the general run of machine tools is largely from the automobile builders, especially the motor truck industry, and manufacturers of accessories, together with the makers of combustion engines for marine, farm and other special purposes other than motor vehicles, rather than from general manufacturing houses.

C. Victor Peterson, recently with the Brown & Sharpe Mfg. Company, has been made the representative for Rhode Island of Hill, Clarke & Co., Inc., Boston, with headquarters at Providence.

The National Woodworking Machinery Company, Manchester, N. H., has been placed in the hands of C. S. Ostoman as receiver on the petition of stockholders. The corporation represents the combination of the woodworking machinery business of Witherby, Rugg & Richardson, Worcester, Mass., and the John A. White Company, Dover, N. H. It is proposed to effect a reorganization which will place the business on a sound financial basis.

It is stated upon what appears to be good authority that the New York, New Haven & Hartford Railroad has definitely decided to electrify and four-track the 45 miles of track between Boston and Providence, R. I., pushing the work to completion in two years. The overhead trolley and single phase system, like that of the New York end of the road, will be employed. Power for the entire division will be furnished by a power station to be located at Providence.

The Standard Mfg. Company, Bridgeport, Conn., is marketing a larger size of worm cutting attachment for its automatic gear cutter, to take work up to 4-in. diameter.

The contract has been awarded for important additions to the works of the Crane Valve Company, Bridgeport, Conn.

The contract has been awarded for the new machine shop of the Blakeslee Drop Forging Company, Southington, Conn., which will be 30 x 160 ft., three stories, of brick and steel.

John W. Olmsted has been appointed receiver of the Valve Seating Tool Company, Southington, Conn.

The New England Watch Company, Waterbury, Conn., has been placed in the hands of John P. Elton,

Waterbury, and Harris Whittemore, Naugatuck, as receivers. They will conduct the business for the remainder of the year, in which time it is believed a reorganization will be effected, to place the affairs of the company on a substantial financial basis.

The Sterling Pin Company, Derby, Conn., will build an addition to its works 25 x 40 ft., four stories, for storage and manufacturing purposes.

Additions to general manufacturing facilities in New England include the Indian Orchard Company, Indian Orchard, Mass., factory building 63 x 203 ft., two stories; Germania Mills, Holyoke, Mass., additional two stories to spinning mill, 120 x 182 ft.; Fisk Rubber Company, Chicopee Falls, Mass., buildings respectively 36 x 120 ft., five stories, and 90 x 202 ft., two stories, of brick mill construction, with steel and concrete floors.

The New Departure Mfg. Company, Bristol, Mass., manufacturer of metal specialties, will erect a three-story building, 60 x 180 ft.

Philadelphia

PHILADELPHIA, PA., July 30, 1912.

A comparatively steady demand for machinery and tools has been maintained in this market; with some sellers the volume of business closed has been reported as slightly above that of the previous week. Builders of both the heavier and special types of tools report a better trade; orders have been coming in more freely, and while mills generally are still operating much under capacity, the increased amount of business is being felt in many plants. Railroad inquiries are still at low water mark, although the trade is figuring on inquiries which have come from Southern roads. Local railroads have been small factors in the trade as far as being purchasers of machinery or tools. There has been a very good run of orders for single and small groups of tools, mostly of the smaller character. Special tools have been taken in larger variety and builders of that class of equipment are operating plants on a better basis. The demand for electric traveling cranes is reported as being quiet. A very fair business is moving in boilers and engines, the demand being largely confined to the smaller class of equipment. The demand for second-hand tools and machinery has been of a fair day-to-day character. A ready sale is found for tools of the modern types, but a moderate volume of business is moving in second-hand boilers and engines. The foundry trade notes some betterment in business as the demand for machinery and tools becomes greater. Steel casting plants are in a number of instances operating at practically full capacity.

The American Dredging Company, Mariner & Merchant Building, is taking estimates for a one-story power house to be erected at its Camden, N. J., plant. The building will be 50 x 75 ft. Boiler and engine equipment are to be purchased.

The Sun Oil Company has begun the erection of a barrel factory at its plant at Marcus Hook, Pa. The building, it is stated, will be 160 x 190 ft., with a wing 70 x 90 ft. A one-story power house of brick and structural steel and several other buildings for manufacturing and storage purposes are to be erected.

The Union Roofing & Mfg. Company, Philadelphia, is reported to have purchased three acres of land in the vicinity of Marcus Hook, Pa., on which it is proposed to build a manufacturing building 200 x 250 ft., and a power house. The concern will manufacture several varieties of patent roofing, tile, etc.

The City Council of Camden, N. J., through its Committee on Municipal Lighting, has entered into a contract with Runyan & Carey, electrical engineers, Newark, N. J., for plans and specifications for the construction of a municipal electric lighting plant. The new plant is to be ready for operation in July, 1914.

The plant of the Union Petroleum Company, Marcus Hook, Pa., was almost entirely destroyed by fire July 24. Statements as to loss are not definite, but it is stated that the plant will be rebuilt as soon as necessary plans can be prepared.

Assistant Director John Meigs, of the Department of Wharves, Docks & Ferries, City of Philadelphia, is making an exhaustive study of mechanical handling systems, with a view to adopting mechanical appliances for the handling of freight on the city docks. Both traveling cranes and the telferage systems, together with overhead tracks, are being considered.

Among items for which bids will be opened on August 20 by the Navy Department are included the following for the League Island Navy Yard: Under sched-

ule 4725, ventilating fans; schedule 4736, brass rod, brass and copper pipe, wrought pipe and pipe fittings. Specifications may be obtained by application to the Navy Pay Office, Philadelphia, Pa.

Bids will be received by Dr. Samuel G. Dixon, commissioner of health, at the Philadelphia office of the Pennsylvania Department of Health, 1900 Race street, until August 12, for furnishing and installing a refrigerating plant for the Pennsylvania State Sanitarium, near Crescent, Pa. Plans and specifications may be obtained on application to the department. The Commissioner of Health is also asking for bids on the construction of two steel water tanks, one near Mt. Alto, Franklin County, and the other one near Cresson, Cambria County.

Local contractors are estimating on a concrete, brick and steel power house and switch house to be built for the Georgia Railway & Power Company, at Atlanta, Ga. The buildings will be one and two stories, 60 x 191 ft. and 48 x 84 ft., respectively.

Herman Loeb, director of the department of supplies, city of Philadelphia, will receive bids until August 5, under class S, iron water pipes, etc.; under class X, corporation cocks. Bids will also be taken on insulated cables for use in the Electrical Bureau. Specifications may be obtained on application to the director, room 312, City Hall.

Baltimore

BALTIMORE, Md., July 29, 1912.

Business in July has shown some improvement. Machine tool builders have had more orders, but the demand is still under normal. Certain merchants have received a better volume of orders, particularly for metal working tools. Sales, however, are confined largely to single tools, but with occasional orders for small groups. In the latter cases the equipment taken is usually in the smaller class of tools. Inquiries for machine tool equipment are reported as being fairly good, but there is an absence of any demand for general equipment of an extensive character. The demand for woodworking tools and machinery has been particularly quiet. A fair business in second-hand machinery, tools, engines and boilers is noted. New business in general power equipment is light. The demand for engines is quiet, although a fair business is reported in medium capacity boilers. A good current business is moving in contractors' equipment, while machine shop supplies are reported as being in better demand. Fabricated material plants generally are more fully engaged. Very little buying of railroad shop equipment has developed, but scattered inquiries from some of the Southern roads are reported. The demand for castings has only been fair and local foundries, while better engaged than they were several months ago, are, generally, still operating below normal capacity.

E. D. Renneburger & Sons, boiler and engine builders, are preparing to erect a structural steel frame boiler shop, 80 x 225 ft., at Alicanna and Boston streets, which will be equipped with modern machinery for the manufacture of boilers. Considerable equipment will be purchased, details regarding which have not been fully decided upon.

Plans have been filed for the erection of a two-story brick packing plant, for John Panze, at 507-9-11 South Dallas street, by Joseph Schamberger, contractor. It is stated that a complete, modern packing plant equipment will be installed.

The Baltimore Tube Company has practically completed the removal of its plant from its former location, Bayard and Carroll streets, to its new plant at Bayard and the Baltimore & Ohio Railroad. Its machine shops have been practically equipped, although additional machinery, such as pumps, accumulators, etc., are to be purchased for the rolling mill department. A month will be required before the new plant is in full running order.

The Fleishman Company will erect a four-story factory building and a power house at Monument and Constitution streets. The buildings will be of stone and brick on concrete foundations, and equipped with machinery for the manufacture of vinegar and by-products. Elevators and a heating system will be installed.

Crook-Kries & Co. have received a contract to install an extensive ventilation system in the boiler and engine rooms of the Belvidere Hotel. This concern recently completed the installation of a ventilation system for the kitchen. It is also completing extensive changes in the power plant of the Knox Net & Twine Company. Current business is reported good, although

the bulk of the orders recently taken have been small individually.

The Colonial Motor Company has filed plans with the Inspector of Buildings for permission to erect a two-story garage at North avenue and Lovegrove alley. It will be 94 x 303 ft., and have a capacity for storing 150 automobiles. All modern appointments are to be installed. The West Construction Company will erect the building.

Wallace Stebbins & Sons report a good volume of business during the past month. A better demand for power equipment is noted and orders have been entered for three 175-hp. Fitzgibbon boilers and piping for the Maryland State Asylum, Spring Grove, Md. Two 125-hp. Fitzgibbon boilers are to be installed in the power plant of Joel Gutman & Co., while some extensive work on the power plant of the Brigham Hopkins Company has been entered. The demand for engines has been quiet, but for small supplies is reported very good.

John D. Adt has recently shipped a large consignment of special machinery for export to Lisbon, Portugal, and has several good orders for tobacco working machinery on the books. An improved local demand for elevators is noted, and considerable work of this character is on hand. Inquiries for special machinery of various classes are good, and the plant continues to operate at full capacity.

The Western Maryland Railway is planning extensive terminal facilities in this city. In addition to the freight yard and storage warehouses now under construction, it proposes erecting at Hillen Station a large warehouse for handling non-perishable merchandise. The building will be 60 x 250 ft., of reinforced concrete. Elevators, chutes and other facilities for the quick handling of freight will be installed. A heating plant and sprinkler system are included. The building will be six stories above ground, with several stories below the street line. Plans are expected to be out for estimate at an early date.

Cleveland

CLEVELAND, OHIO, July 30, 1912.

The volume of business in machine tool lines during July in this territory showed a gratifying increase over June. While no large orders were placed there was a good demand for small lots of tools. The buying was well distributed over about all lines of industry that use machine tools. Small inquiries have been good live ones that resulted in the quick placing of orders in most cases. From the standpoint of inquiry, July has shown more improvement over June than when viewed from the amount of business actually placed. Considerable general inquiry is pending from concerns that could make use of additional machinery equipment at present, but are holding off to see if the present volume of their own orders holds up. As a result of this hesitancy the opinion is expressed that the volume of machinery sales is somewhat less than it should normally be, considering the activity of manufacturing plants. In the week past there was a fairly good volume of orders for from one to four tools. Bids on the large list recently sent out by the Lima Locomotive Corporation have been tabulated and dealers look for the buying of the machinery on this list within the next two weeks.

In handling equipment there is a very good demand for various kinds of hoisting and conveying machinery for industrial plants. The demand for portable electric tools is very active.

Cleveland manufacturers in some lines have been handicapped during the past week by a strike of the pattern makers in the jobbing pattern shops, who demanded an advance in wages from 42½ to 47½ cents an hour. Some of the employers have granted the advance and it is believed that the men will all soon be back to work.

A new foundry will be built in Cleveland by the Allyne-Ryan Foundry Company, which has just been incorporated with a capital stock of \$100,000. The company has about closed a deal for a site and will shortly begin the erection of a plant that will include a molding department 80 x 100 ft., a core room 100 x 160 ft. and a two-story building for offices and other purposes. The company will make a specialty of automobile parts. D. J. Ryan, at present superintendent of the Interstate Foundry Company, Cleveland, will be president and manager. Among others interested in the company is E. E. Allyne, president of the Allyne Brass Foundry Company and the Aluminum Castings Company, Cleveland.

The American Steel Package Company, Defiance, Ohio, has commenced the erection of additions to its plant which will add 50,000 sq. ft. to the floor space and nearly double the capacity. The new buildings will include one 78 x 450 ft. for the manufacture of steel barrels; extension of the galvanizing building to 100 x 125 ft.; a power house 70 x 90 ft., and a building 42 x 42 ft. to be used in generating the gases used in welding. The buildings will be of modern factory construction. In the power house one 100-hp. and three 150-hp. boilers will replace present equipment. A new heating system will also be installed in all of the buildings.

The Hart Mfg. Company, Cleveland, Ohio, will shortly begin the erection of a new plant on East Twentieth street. This company, which is now located on East Third street, has outgrown its present quarters, and will provide a plant with double its present capacity. The new building will be about 150 x 250 ft., two stories, of reinforced concrete construction. Some new machinery equipment will be required. The company makes die stocks.

The H. S. Metal Specialty Company, Cleveland, has been incorporated with a capital stock of \$10,000 to manufacture metal specialties and novelties. The incorporators are Frank T. Cullitan, E. Sanderson, W. G. Stuber, G. Hagenbach and A. B. Bardwell.

The Foley-Wardwell Mfg. Company, Cleveland, has been incorporated with a capital stock of \$20,000 to manufacture automatic meat saws, filers, etc. The incorporators are Hugh B. Foley, F. W. Wardwell and others.

The C. O. R. Cutter Company, Cleveland, has been incorporated with a capital stock of \$36,000 to manufacture machine tools, by C. F. Heinkel, E. C. Heinkel, L. E. Hulet and others.

The Cleveland-Galion Motor Truck Company, Galion, Ohio, has commenced the erection of an addition to its plant 37 x 70 ft. It is stated that the building is to supply temporary requirements until the company can complete plans for a large manufacturing plant.

Sealed proposals will be received by C. W. Stage, director of public safety, Cleveland, August 8, for a water tube boiler and stoker for the city Cooley Farms, Warrensville, Ohio.

The foundry of Wilkoff Bros., Youngstown, Ohio, was struck by lightning and burned July 18.

The Kinsey Mfg. Company, Toledo, Ohio, has increased its capital stock from \$1,000,000 to \$3,000,000.

The village of Milton, W. Va., will issue \$10,500 in bonds for the installation of a water works system.

Detroit

DETROIT, MICH., July 30, 1912.

July has shown considerable activity in the Detroit market and has been a very satisfactory month for the majority of dealers. Business was somewhat disturbed the past week, owing to Cadillaqua, Detroit's water carnival, many factories and shops closing entirely for one and two days. The bulk of transactions have been in single tools, with here and there a group of from three to five tools, replacements seemingly figuring largely in the week's business. New business is coming out in promising abundance, inquiries covering a wide range of both metal and woodworking equipment. A steady demand for sawmill equipment is reported both for replacement and for new enterprises. Prospects in the boiler and engine trade are very encouraging, especially for the smaller class of installations. Only moderate sales of second-hand machinery are reported. The foundry trade continues well engaged. An increased demand for pumps is noted and electrical machinery is holding its own. Building conditions have improved, although contractors complain of a shortage of labor.

The Paige-Detroit Motor Car Company, Detroit, has acquired one of the branch plants of the United States Motor Company in this city and will devote it entirely to the manufacture of engines. The equipment is now being installed. The company will now utilize its main plant exclusively in the building of automobiles.

The National Twist Drill & Tool Company, Detroit, has awarded a contract for the erection of a new factory building to be 38 x 85 ft., three stories, and of reinforced concrete construction.

The Swartz Foundry Company, Detroit, has begun the construction of its new foundry building at Fort and Vermont streets.

The Thomas Forman Company, Detroit, manufacturer of flooring, has increased its capital stock from \$250,000 to \$300,000.

The Mote Demountable & Detachable Rim Company, Detroit, has been incorporated with \$30,000 capital stock to manufacture metal wheels and rims for automobiles. Herman Mote, Harold L. Bock and W. M. Elliott are named as incorporators.

The Troike Muffler Company, Detroit, has been incorporated with \$50,000 capital stock by Ernest Troike, George Derhr and Nicholas Kupper. The new company will take over the business of Ernest Troike & Co., Sandusky, Ohio, manufacturers of mufflers for gas and gasoline engines, and it is reported that the plant will be removed to Detroit.

The Detroit Regulator Company, Detroit, has been organized with \$1,000 capital stock by F. L. Hurd, J. E. Blackmore and others, and will engage in the manufacture and sale of power plant machinery and supplies.

The R. M. D. Mfg. Company has been incorporated at Detroit with \$10,000 capital stock to manufacture wood and metal novelties. A. E. MacDonald and F. V. Rindfusz are the principal stockholders.

The Young Electrical Company, Detroit, has been incorporated with capital stock of \$50,000. Philip Young, Charles F. Tomlinson and Guy W. Caverly are the incorporators of the company, which will manufacture an electric mixing device for delivering electricity to motors.

The Manufacturers Sales & Engineering Company, Detroit, has been incorporated to manufacture automobile parts and tools. The capital stock is given at \$1,000.

The Austin Automobile Company, Grand Rapids, Mich., recently incorporated, has secured a site of six acres and will soon begin the erection of a large factory building.

The United Steel & Wire Company, Battle Creek, Mich., which recently succeeded the Battle Creek Oven Rack Company, manufacturer of oven racks and electric welded wire goods, has completed plans for a new factory building 35 x 100 ft., two stories, and will extend its mechanical equipment.

The Triplex Mfg. Company, Muskegon, Mich., recently organized, has secured a factory building and will engage in the manufacture of mops and hardware specialties. Little equipment will be required.

The Central Loose Leaf Company has been organized at Benton Harbor, Mich., with \$10,000 capital stock by W. Koch, H. C. Buster and others. The company will manufacture a line of binding devices.

O. H. L. Wernicke, Grand Rapids, Mich., is interested in the organization of a company which will manufacture a rotary pump of new design. The new concern will be known as the Wernicke-Hatcher Pump Company.

C. A. Swanson, Tustin, Mich., is preparing to develop his large timber holdings in Osceola County, and will establish a sawmill.

The Board of Trade of Ludington, Mich., has concluded negotiations with the M. Reichardt Company, Chicago, piano manufacturer, whereby the company will remove its business to Ludington. A three-story factory building has been secured.

The Spade Mfg. Company has been organized at Kalamazoo, Mich., with \$50,000 capital stock and will engage in the manufacture of automobile parts and do a general machine shop business. The company has acquired a site and will immediately begin the erection of a large factory building.

G. E. Woolf, Copemish, Mich., will erect a 50-barrel flour mill, 32 x 32 ft. Modern grinding machinery and three gasoline engines will be installed.

It is reported that the Knech Planer Company, Cincinnati, machine tool manufacturer, is negotiating with the authorities at St. Joseph, Mich., with regard to locating in that city.

The Mika Cooker Company, Saginaw, Mich., manufacturer of fireless cookers, has been reorganized and will not remove its plant to Kalamazoo as reported in the daily press. Joseph Seemann is president of the reorganization.

It is reported from Muskegon, Mich., that a group of Chicago capitalists, headed by Sidney R. Weil, will erect a steel smelting plant in that city. The report states that power will be obtained from a dam to be placed across the Muskegon River.

Cincinnati

CINCINNATI, OHIO, July 30, 1912.

Although August is usually a dull month with machine tool builders, this year it is expected to make an exceptionally good record. In addition to several large lists before the trade, there is an improvement in the domestic demand for single tools, and the inquiry is confined to no particular section of the country. The export business is also holding up remarkably well for this season of the year. An evidence of increased activity is found in the scarcity of skilled labor.

Second-hand machinery dealers all report slow business, but they are anticipating an improvement before the summer season is over. The foundries are busier than for some time past. One large local foundry is drawing five heats a week, as against two per week three months ago, and this fairly represents the improvement with the majority of the foundries in this locality.

The Cincinnati Branch, National Metal Trades Association, held its seventh annual outing for employees at Chester Park, July 27. There was an estimated attendance of nearly 30,000 and the outing was generally declared the most successful of any yet held. The following speakers made short addresses at a dinner tendered to the officers of the association and their guests: William Lodge, B. B. Quillen, A. M. Robinson, E. A. Mueller, J. M. Manley, L. H. Raymond and William S. Dickson.

The Central Vermont Railway Company, J. B. Laurie, purchasing agent, St. Albans, Vt., is inquiring in this market for the following lot of machine tools:

Two 48 x 86-in. radial drilling machines with 6-ft. arms.
 One 1/2 x 2-in. double head bolt cutter, complete with pump and piping, dies, nut taps, etc., belt driven.
 One universal grinding machine; centers to swing 12-in. and take in 36-in., belt driven.
 One 36-in. x 18-ft. triple gear engine lathe, belt driven.
 One 90-in. heavy model driving wheel chucking lathe.
 One 42-in. heavy pattern new model car wheel lathe, center driven.
 Two 26-in. heavy duty shaping machines, motor driven.
 One 48 x 48-in. x 18 ft. planing machine.
 One locomotive axle lathe, swing over carriage 14 in. distance between centers 8 ft., motor driven.
 Two 26-in. new model turret lathes, belt driven.
 One 42-in. boring and turning mill, single pulley drive.
 One 84-in. heavy boring and turning mill, motor driven.
 One 48 x 48-in. x 10-ft. planing machine motor driven.
 Two 14-in. x 8-ft. engine lathes, belt driven.
 Two 17-in. x 8-ft. heavy duty manufacturer's lathes, belt driven.
 Two brass lathes, 18-in. swing, with friction geared head, belt driven.
 Two 26-in. x 14-ft. heavy engine lathes, both belt and motor driven.
 One bolt heading machine, for making bolts 3/4 to 2-in., belt driven.
 One 96-in., 600-ton driving wheel press, motor driven.
 One 36 x 36-in. x 8-ft. heavy slab milling machine, motor driven.
 One 3-ft. arm plain radial drilling machine, working surface of base plate 30 x 33-in., belt driven.
 One motor driven combined punching and shearing machine, 36-in. throat, to have a capacity to punch 1-in. holes in 1-in. plate, and shear 7 x 1-in. flat, or 1 1/4-in. round.
 One 18-in. stroke heavy slotting machine, motor driven.
 One 1 1/2-in. three-head bolt cutting machine, belt driven.
 One 36-in. band sawing machine, with iron tilting table, belt driven.
 One 12-in. hand planing and jointing machine, belt driven.
 One 20-in. x 10-ft. pattern makers' lathe, belt driven.
 One set motor driven No. 6 horizontal bending rolls; capacity for plate 12-ft. wide, 3/4-in. thick.
 One No. 2 cotter and keyseating drilling machine, belt driven.
 One 25-ton, 3-motor electric traveling crane.
 One 5-ton hand traveling crane.

The Stewart Iron Works Company, Covington, Ky., a Cincinnati suburb, is receiving bids for rebuilding its plant that was partially destroyed by fire several weeks ago. It is also the intention of the company to enter into the manufacture of a special one-ton delivery truck. The proposed auto-truck factory will be 100 x 425 ft., three stories, and of brick and steel construction. W. N. Taylor has charge of the auto-truck department, and will soon issue a list of machine tools and other equipment that will be required. Another three-story brick and steel building 100 x 225 ft. will be erected to take care of the company's iron fence and jail work business. In addition, there will be two one-story warehouses, 60 x 175 ft., of steel and corrugated iron construction.

The Norwood Sash & Door Company, Norwood, Ohio, will soon have plans completed for a large addition to its plant, and for which will be required considerable woodworking machinery and other equipment. Harry Hake, Cincinnati, is designing plans for the proposed structure, that will be 80 x 300 ft., five stories.

The Valley Machine Company, Parkersburg, W. Va., has been incorporated with \$150,000 capital stock, to operate a machine shop and foundry. The new company takes over the business and plant of the Stiles Foundry & Supply Company, and will probably make some extensions in the near future. R. G. Stiles, Parkersburg, is one of the principal incorporators.

The Ice Delivery Company, Cincinnati, is contemplating erecting a large plant at Bridgetown, Ohio, a Cincinnati suburb.

The Reliance Engineering Company, Fourth National Bank Building, Cincinnati, will soon be ready to receive estimates on a large addition to the trunk factory of the Drucker & Mendel Trunk Company, in Norwood, Ohio.

The Piano Player Mfg. Company, Cincinnati, has leased a four-story building in Covington, Ky., and will soon move its plant from its present location on Sixth street. A small amount of additional equipment will be required to fit up the new quarters.

The city of Cincinnati will soon ask for bids for an additional pump to be installed in the waterworks plant near California, Ohio. The proposed pump must be rated to deliver 17,000,000 gal. of water every 24 hours.

A new company known as the Cordesman-Meyer Company, Cincinnati, has taken over the woodworking machinery plant of Cordesman, Meyer & Co., on Central avenue, and will make some extensive additions at an early date. John G. Johannigman, formerly superintendent of the Oesterlein Machine Tool Company, and Charles Koebbe, of the Fosdick Machine Tool Company, are the principal members of the new firm.

Indianapolis

INDIANAPOLIS, IND., July 30, 1912.

The Indianapolis Gas Company will erect a new gas plant with capacity equal to its present one, raising the company's production to 12,000,000 cu. ft. a day. The Semet-Solvay system will be installed. The Citizens Gas Company is also increasing its output from 4,500,000 cu. ft. a day to over 7,000,000. Since the price of gas was reduced to 60c. both companies have been pressed to keep up with the increased demand, and they have had to use the most modern appliances and methods in connection with the manufacture of better gas at lower cost.

The inventory and appraisal of the Atlas Engine Works in this city, to be sold under court order, have been filed with the court by Fred C. Gardner, receiver. They show a total of \$1,135,724 in cash on hand and \$234,905 in accounts. The buildings are appraised at \$518,056, the grounds at \$117,600, the machinery at \$351,845, and the water and sprinkling system at \$50,000. The book value of the machinery is \$828,768.

The Indianapolis Tool & Mfg. Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture tools and engines. The directors are C. Herdink, B. H. Herdink and William Herdink.

The Cole Motor Car Company, Indianapolis, has increased its capital stock from \$200,000 to \$500,000.

The Jones Mfg. Company, Evansville, Ind., has been incorporated with \$10,000 capital stock, to manufacture safety tubes for blasting powder in mines. The directors are John H. Jones, Jabez Worley, H. W. Matters and O. W. McGinnis.

J. F. Cole, South Bend, Ind., is preparing plans for the waterworks plant for the West Terre Haute Waterworks Company, West Terre Haute, Ind., which has obtained a franchise from the City Council.

The management of the Ames Tool Company, Anderson, Ind., says there will be no shutdown this summer. The demand for shovels is unusually large and the 225 employees will have to do without a vacation.

The branch of the American Car & Foundry Company, Terre Haute, Ind., has received orders that will make necessary the increase of the number of employees from 300 to 800.

Marshall Newhouse, Percy Walker and Charles Younger, of Rushville, Ind., have invented a corn husker, and it is expected the machine will be manufactured for work on the next corn crop when it matures.

The Central South

LOUISVILLE, KY., July 30, 1912.

While business in the first month of the second half of the year has not been rushing, a satisfactory amount of trade has been handled by machinery men, who are looking forward to favorable developments during the next month or two. Though August is nearly always dull, enough inquiries are coming in to suggest that business will be well above the average during the month. Electrical equipment, which has been rather quiet in the past few weeks, is more active at present, and woodworking machinery is pretty close to being a leader. Conveying machinery of all kinds is moving rapidly at

present, coal mines, sawmill plants and others accounting for a good part of the sales.

The Norman Lumber Company, Louisville, is considering the installation of a conveying system for handling mill refuse at its plant at Holly Ridge, La.

The Mengel Box Company, Louisville, is planning the installation of an overhead conveyor at its box factory at Twelfth and Ormsby streets. A municipal franchise has been created by which it will be permitted to cross a street. A belt conveyor will be used. Address T. S. Hamilton.

Members of the Board of Public Works, Louisville, are making an inspection of garbage reduction plants in other cities with a view to installing one here. John D. Wakefield is chairman.

The plant of the Longest Bros. Company, Louisville, which is turning out motor trucks on a small scale, may be used as the basis for the Edwards Motor Car Company, which is being organized with a capital stock of \$750,000. Men formerly interested in the Stoddard-Dayton Motor Car Company will be connected with the new concern, it is stated.

The Piano Player Company, Covington, Ky., is establishing a plant for the manufacture of pianos and player pianos, piano actions, etc. The Industrial Club of Covington is interested in the concern.

A steam heating plant costing, it is estimated, \$4,000, will be installed in the Shelby Graded School, Shelbyville, Ky. J. D. Hall is secretary of the school board.

Henry Bros., Taylorsville, Ky., have been awarded an electric light franchise. They operate a flour mill at present, and will install a power plant which will be used in both connections.

The McDaniel Milling Company, McDaniel, Ky., is to install some additional milling machinery.

The Engineering Appliance Company, Covington, Ky., has been incorporated with \$2,500 capital stock by Paul G. Schwarz, Wilbur Kaiser and others.

The Pinos Altos Milling & Smelting Company has been organized with \$150,000 capital stock by F. M. Barnard, M. M. Coverdale and M. E. Dorsey. The address of the company is Smithland, Ky.

The Bluegrass Condensed Milk Mfg. Company, Shepherdsville, Ky., plans the installation of a plant to cost \$75,000. Refrigerating equipment will be needed. The plant will have a capacity of 10,000 gal. a day.

The Municipal Electric Light Plant, Madisonville, Ky., is considering the installation of a water works. Rankin Eastin is superintendent.

George Tomlinson, Winchester, Ky., is to install machinery for the manufacture of tobacco hogsheads. The plant will have a capacity of 1000 hogsheads a day. Planing-mill work of all kinds will be carried on. The factory will have its own light and power plant.

The Burkesville Light & Milling Company, Burkesville, Ky., has been formed with \$1,800 capital stock by C. C. Baker, C. R. Payne and others. They have purchased most of the equipment needed for their electric light plant.

The Bourbon Fiscal Court, Paris, Ky., has authorized the purchase of a 20-hp. engine to be used in road-building work. Roger Burris is chairman of the committee in charge.

The John Lewis Planing Mill Company's plant at Glasgow, Ky., was burned July 23 with \$15,000 loss. It will be rebuilt.

The Cayce-Jones Motor Company has disposed of its machine shop and other assets to the Forbes Mfg. Company, Hopkinsville, Ky. The business is to be enlarged.

Newport, Ky., is preparing to let a contract for the installation of an incinerator. Address Mayor Helmbold.

The D. E. Hewitt Lumber Company, Huntington, W. Va., which has purchased a timber tract near Prestonsburg, Ky., will erect a sawmill at that place.

R. A. Choate, Frankfort, Ky., will erect a mill for the manufacture of sash, doors, etc., and will install individual motor-driven woodworking machinery.

C. Childers, Campton, Ky., is purchasing machinery for installation in a large sawmill which he is erecting there. The Hagan Engine Company, Winchester, Ky., will furnish the power equipment.

The Prendergast Cotton Mills, Prendergast, Tenn., has been incorporated with \$100,000 capital stock and will erect a plant at once. John Morrow is general manager.

The Farmers' Ground Rock Phosphate Company, Mt. Pleasant, Tenn., will increase its capacity to 60,000 tons a year. Machinery for the reduction of the material will be installed. C. W. Alexander is general manager.

The Ford Motor Company, Detroit, Mich., will build

an assembling and distribution plant at Memphis, Tenn. R. P. Jones is in charge of the office at that point.

Gilleland & Co. are planning the installation of a sawmill at Clarksville, Tenn. Officials of the Tennessee Central Railway have details of the project.

The Tennessee Eastern Electric Company has purchased the plant of T. F. Hartis, Jonesboro, Tenn., and will install new machinery, making it a substation through which to distribute current from a hydroelectric plant which it is to build on Clinch River, near Greeneville, Tenn.

The George Peabody College for Teachers, Nashville, Tenn., will purchase power machinery and equipment for a manual training department, work on the buildings having begun. Ludlow & Peabody, New York, are architects. Bruce Payne is president of the college.

The Hartsville Fertilizer Company, Nashville, Tenn., has been organized and will establish a plant for the manufacture of commercial fertilizer, cottonseed oil, etc. John A. Bell, A. C. Read and others are members of the company, which has \$15,000 capital stock.

The Bilbrey-Welch Spoke Company, Nashville, Tenn., will establish its plant as soon as a site can be secured. The company has \$50,000 capital stock and J. C. Bilbrey is president. The Nashville Industrial Bureau is interested.

The Southern Queen Range Mfg. Company, Chattanooga, Tenn., has filed a petition in bankruptcy, showing assets of \$27,430 and liabilities of \$60,296.

The Roan Creek Electric Light & Power Company, Mountain City, Tenn., has been formed with \$5,000 capital stock and will operate a street lighting system. R. E. Donnelly, H. A. Donnelly and others are incorporators.

Announcement is made that the Vicksburg Light & Traction Company, Vicksburg, Miss., which has been formed to take over the public utilities there, will build a new power house. I. C. Elston, Jr., New York Life Building, Chicago, is secretary and treasurer of the company.

The Humason Lock, Nut & Mfg. Company, Shreveport, La., is being organized and will market a new product. G. A. Humason is at the head of the company, which will probably have its goods made by contract for the present.

Birmingham

BIRMINGHAM, ALA., July 29, 1912.

There is a steady demand for small machines in all lines of the machinery trade. Mill supplies are going well. Dry weather has added to facility of movements and installation of boilers, engines and pumps. Inquiry for pumps is reported as improving. Mines, sawmills and ginneries are among the principal customers in the market for a variety of demands. The trade continues to compare more than favorably with the usual at this time of the year, while the outlook also maintains a favorable aspect.

The plant of the Blakeley Variety Works, Blakeley, Ga., which was recently burned, will be rebuilt. T. F. Cordray is proprietor. The loss was \$8,500, covered by insurance.

The turpentine distillery of J. C. Prine near Citronelle, Ala., was recently burned. It will be rebuilt.

The tobacco warehouse and factory of Hernando Tobacco Company at Brooksville, Fla., was burned recently.

The Hills-McCanna Company, maker of steam specialties, has located a branch in Birmingham, with J. D. Scruggs in charge.

The sawmill and steam power plant of the Tampa Box Factory, Tampa, Fla., Henry Leiman, president, was burned recently with a loss of \$40,000. It will be rebuilt, a portion of the plant continuing in operation.

It is reported at Macon, Ga., that Armour & Co., Chicago, will establish an acid plant to cost \$250,000. Plans are said to have been prepared.

The Glynn Canning Company, Brunswick, Ga., will install new machines and enlarge its plant.

A crate factory will be built at Inverness, Fla., by the Baum & Van Roy Crate Company.

B. B. Comer and associates, owners of the Avondale Cotton Mills in Birmingham, announce that they will establish a new cotton factory at a cost of about \$600,000. The exact location is not known.

A 33-year franchise to operate a gas plant has been

granted to George W. Deen and associates at Waycross, Ga.

A screen factory will be established at Americus, Ga., by the Cannon Screen Company, with a capital stock of \$25,000 with privilege to increase to \$100,000. Jesse Cannon, W. S. Ivey and others are the incorporators.

Application has been made at Boggy, Fla., for the incorporation of the Union Land & Lumber Company to operate turpentine distilleries, manufacture lumber, etc. H. M. Sessions, of Ozark, Ala., is president.

Dr. E. P. Rose has bought 5000 acres of timber land near Valdosta, Ga., and will develop it for lumber and turpentine.

A permit to erect a grain elevator to cost \$40,000 has been issued to W. M. Cosby, of Birmingham, Ala.

Dr. J. G. Smith is constructing an electric lighting system at McDonough, Ga., under a franchise recently granted. A water plant is also being built.

The city of Conyers, Ga., has voted to issue \$60,000 in bonds for the purpose of installing waterworks and sewers.

St. Louis

ST. LOUIS, Mo., July 29, 1912.

While there has been some slackening up in the demand in the machine tool market in the past week, it is scarcely more noticeable than was to have been expected at the present period of the year. One peculiarity, however, is the fact that the city business is above the proportion naturally to be expected, while that of the surrounding territory is below. Just why, no one is prepared to explain. Dealers are figuring on the Diesel Engine, Missouri, Oklahoma & Gulf and the Missouri Pacific lists, no new ones having come out in the week. Collections are reported fair for the season.

C. E. Murray, R. A. McGregor and J. E. Harsh have formed a light and traction company at Sedalia, Mo., which is to have a capital stock of \$1,500,000, for the development, generation and distribution of both gas and electricity for both power and illumination purposes.

The Burns Ramsden Motor Car Company, St. Louis, previously reported, has leased quarters and is preparing for its mechanical installation as rapidly as possible.

The Malcolmson Briquette Engineering Company, St. Louis, with \$24,000 preliminary capital stock, has been incorporated by David R. Francis, James E. Rutledge, John Scullin, Charles Gilbert and C. T. Malcolmson to equip plants for the briquetting of coal.

The city of Hermann, Mo., voted last week to issue \$35,000 of bonds for the construction and equipment of a waterworks plant.

The Western Automobile Company, St. Louis, has bought a site for the construction of a building to be occupied by a large auto repair plant.

The plans for a hydroelectric plant at Cotter, Ark., are stated to include the removal from Crane, Mo., to Cotter, Ark., of the Gould railroad system shops now at the former place.

A large creamery, with extensive mechanical equipment, is to be built and equipped at Willow Springs, Mo., by D. C. Preston, of Seymour; N. P. Jacobson, of Diggins; C. A. Harndon, of Ava, and others.

The Fidelity Lumber Company, Kansas City, with \$650,000 capital stock, has been incorporated by R. A. Long, C. B. Sweet, F. J. Bannister and others to equip and operate lumber mills, etc.

The Missouri Gas Heater & Appliance Company, St. Louis, has been incorporated by James J. Rohan, Hugo F. Urbauer, R. A. Crabb and others with \$25,000 capital stock, to manufacture boilers and other apparatus for heating purposes.

The Western Screen & Door Company, St. Louis, with \$100,000 capital stock, has been organized by E. M. Meck, M. L. English and E. C. Snell to equip a plant for the manufacture of doors, screens, etc.

The Kipfel Mfg. Company, of Illinois, has been authorized to use a large portion of its \$100,000 capital stock in a plant at St. Louis.

The Midland Battery Company, Kansas City, Mo., with \$25,000 capital stock, has been incorporated by A. C. Owens, C. N. Bird and Samuel Silverman to equip a plant for the manufacture of storage batteries.

The Lackland-Dorsett Water Supply Company, Ascalon, Mo., with \$2,000 preliminary capital stock, has been formed by F. R. Harris, A. F. Calkin and W. C. Shields to install a public service water plant.

The Hudson-Latham Motor Company, Kansas City, Mo., with \$100,000 capital stock, has been organized by

W. A. Latham, C. B. Boyd, W. M. Boyd, and B. Downing, to equip a plant for the manufacture of motors.

The K. C. Lumber Company, Lucedale, Miss., has completed plans for the construction of a canning plant of 10,000 cans daily capacity and will equip it at once.

The Independent Packing Company, Tulsa, Okla., with \$25,000 capital stock, has been incorporated by J. F. Wheatley, Uley Helderman and S. F. Jones to establish a plant at once.

A chemical brick plant to manufacture by the Sanderson process has been arranged for at Opelousas, La., by L. E. Little, J. G. Lawler, Louis Hebert, N. S. White and others; capital, \$25,000.

The Conway Compress Company, Conway, Ark., with \$50,000 capital stock, will build a compress with a capacity of 1000 bales per day. D. O. Horton, G. L. Bahner and others are interested.

W. B. Hinton, A. J. Parker, A. P. Beasley and others have completed arrangements for the construction of a cotton gin at Stamps, Ark., the capital stock of the company being \$10,000.

The East St. Louis Cotton Oil Company, East St. Louis, Ill., has completed plans for the construction and equipment of a cotton gin at Hickman, Ky.

The Planters' Ginning Company, Sarah, Miss., with \$10,000 capital stock, has been organized by A. W. Teager, W. E. Landrum and Calvin Perkins. The plant will be equipped at once.

The Hot Springs Electric Company, Hot Springs, Ark., will reconstruct its plant, the equipment including a 1400-kw. generator, steam turbine type, a converter, condenser, etc. The National Light & Power Company, of St. Louis, has charge of the work.

The Imperial Heating Company, of Kansas City, Mo., is planning for the establishment of a plant at Joplin, Mo., to manufacture gas heating stoves.

H. R. Denton, C. L. Thomas and B. P. Norvell, of Muskogee, Okla., have organized the E. G. Parsons Oil Company to equip and develop property owned by the stockholders.

The Mars Drilling Company, Okmulgee, Okla., with \$50,000 capital stock, has been organized to drill oil lands under contract and is in the market for equipment. The incorporators are E. W. and A. J. and N. K. Gill.

The Stigler Ice & Electric Company, recently reported as incorporated with \$45,000 capital stock, will equip and operate a 12-ton ice plant at Stigler, Okla.

The Reeves Timber Company, Helena, Ark., with \$100,000 capital stock, has been incorporated by W. D. Reeves, E. C. Horner, J. W. Thale and others to equip a mill.

A large sawmill is to be built at Hummock, Ark., by Elsberry & Brewster, of Pine Bluff, Ark., who have purchased 3200 acres of hardwood timber land.

The Otter Creek Mining & Milling Company, Muskogee, Okla., with \$200,000 capital stock, has been organized by W. P. Kendall, H. H. Tucker and I. T. Owen to put machinery upon property owned by them.

The Hot Springs Water Company is preparing to electrify its pumping plant and will install one 3,000,000 and one 4,000,000 gal. motor driven pump.

The Black & Norton Company, Brinkley, Ark., with \$100,000 capital stock, has been incorporated by J. T. Black, J. L. Norton and C. G. Norton to equip a plant for the manufacture of handles.

The Canton Creamery Company, Canton, Ill., with \$7,500 capital stock, has been organized by A. J. Taylor, Edward McBroom and Charles W. Martin to build and equip a creamery.

Sealed proposals will be received by M. D. Shannon, mayor, Morgan City, La., until August 14, for installing a complete waterworks, sewerage and water purification system. Plans and specifications can be had from Xavier A. Kramer, consulting engineer, Magnolia, Miss.

Texas

AUSTIN, TEXAS, July 27, 1912.

Hot, dry weather is causing some deterioration of the growing cotton, but the crop is not as yet being seriously menaced and the early prediction for a record breaking production still holds good. Business conditions are on the whole unusually good for the midsummer season. Building operations continue very active and plans for new work in this line come to light daily. Many large industrial projects are on foot involving the expenditure of several million dollars. It is claimed by the promoters of large enterprises that it is much easier now to obtain money for this character of Texas investments than in the history of the state. This is consid-

ered a good sign and is believed to portend the beginning of a new era of Texas development.

The Commissioners' Court of Dallas County will erect new bridges over White Rock Creek on the Richardson road, over Prairie Creek on the Seagoville road and over the same creek on Miller's Ferry road. These three bridges will be of concrete construction. In addition to them several other small steel bridges will be erected in different parts of the county. G. F. Witt, county engineer, is preparing the plans.

The City Commission received two bids for the installation of a water purification plant at Dallas. One is from the New York Continental Jewel Filtration Company, New York City, for \$261,828 and the other from the Fred A. Jones Company, Dallas, for \$266,336. The bids exceeded the estimate of the consulting engineer for the city, who prepared the plans, and it is probable that they will both be rejected and advertisement made for new bids.

The Mt. Pleasant Canning factory, which was recently destroyed by fire at Mt. Pleasant, Texas, will be rebuilt.

Messrs. Smith and Hahn and associates are making arrangements to establish a plant at Flatonia, Texas, for the manufacture of aeroplanes.

The Poteet Coal & Sand Company has been organized at San Antonio with a capital stock of \$15,000 for the purpose of operating coal and lignite mines and sand beds in the vicinity of Poteet, Texas. It will install a large amount of machinery and equipment. The incorporators are E. W. McKey and R. P. Hare of San Antonio and W. P. Callaway of Poteet.

The Robert M. McClandish Engineering Company, Inc., of Kansas City, Mo., is preparing the plans for the livestock slaughtering plant and various allied industries which are to be established at El Paso, Texas, at a cost of \$1,500,000. The buildings and equipment include a power plant, a terminal railroad, an ice plant, a by-products plant, a soap factory, a warehouse, tunnel and an outside lighting system.

Bonds amounting to \$364,950 have been voted in Matagorda county by taxpayers of drainage districts of that county for the purpose of constructing drainage systems in three districts. District No. 2 embraces 90,000 acres and the cost of the proposed work is \$234,000. District No. 3 embraces 16,000 acres and the cost will be \$27,950. District No. 4 embraces 45,000 acres and involves an expenditure of \$103,000. Considerable dredging machinery will be required to carry out these improvements.

The Norwood Gin Company has been organized at Norwood, Texas, with a capital stock of \$14,000. The incorporators are Cliff Torrance, R. F. Brown and A. W. Warner.

The Bardwell Gin Company, which has been organized at Bardwell, Texas, with a capital stock of \$12,000, will install a cotton gin. The incorporators are C. L. Sutton, W. S. Robertson and A. L. Whitting.

Holloway & Sons of Hondo are installing a cotton gin at Covey Chapel, Texas.

The Chamber of Commerce of Temple, Texas, is promoting the establishment there of a plant for the manufacture of pumps.

E. H. McCormick will install a cotton gin at Eldorado, Texas.

The Farmers & Ginners Cotton Oil Company is erecting new buildings and will install a complete equipment of machinery in their new cottonseed oil mill at Sulphur Springs, Texas, that is to replace the plant which was recently destroyed by fire. The new mill will cost about \$90,000.

The plans of the Stone & Webster Engineering Corporation of Boston, Mass., for the construction of an interurban electric railway from El Paso, Texas, down the valley of the Rio Grande to Socorro, Texas, 20 miles, has taken definite shape in the formation of a subsidiary that is to carry out the project. It is known as the Rio Grande Valley Traction Company and has a capital stock of \$300,000.

The Grant Bros. Construction Company is establishing a construction camp at Miami, Ariz., preparatory to carrying out its contract for the grading and construction of an extension of the Arizona Eastern Railroad from that place to the mill site and mines of the Inspiration Copper Company.

The Rio Grande Wax Company, which recently installed a plant at Alpine, Texas, for the manufacture of wax from the candelilla plant, will install several other similar factories in this part of Texas.

The Federal Government of Mexico, will soon let the contract for the dredging of the harbor of San Blas. The work will cost several hundred thousand dollars.

The Pacific Coast

PORTLAND, ORE., July 23, 1912.

Local dealers are getting little benefit from railroad inquiries for machine tools, such business as has originated in this district being taken East. The small trade has been rather slow this month, though inquiries are beginning to come out a little more freely. The effect of the apparent failure to obtain a continuation of direct steamer connection between this port and the Orient has been somewhat depressing. Interior development of Oregon, Washington and Idaho is progressing rapidly, however, and crop conditions this season are satisfactory. Machinery requirements in the lumber industry are increasing and a large amount of logging equipment will probably be required in the next few months.

The Board of Public Works, Seattle, Wash., has placed orders for contractors' machinery amounting to \$25,000 for work on the proposed Cedar River dam.

The Clackamas Power & Irrigation Company, this city, is preparing to build a hydroelectric plant on the Clackamas River near Oregon City. A 60-ft. dam will be built, with a generating unit of about 10,000 hp. capacity, and provision will be made for a second unit of about 7000 hp.

The Bayside Iron Works has been incorporated at Everett, Wash., with a capital stock of \$100,000. by C. J. Witnew, P. E. Hall and G. W. Mumaw.

The West Coast Iron Works, Seattle, Wash., has been incorporated with a capital stock of \$25,000 by A. K. Isham and C. E. Gregg.

The Feeney & Bremer Company has been incorporated to conduct a machine shop at Tillamook, Ore., with a capital stock of \$10,000, by James Feeney, F. Bremer and H. T. Botts.

The Weyerhaeuser lumber interests plan to build a large lumber mill and general woodworking plant near Boise, Idaho.

The C. A. Smith Lumber & Mfg. Company, Marshfield, Ore., expects to have plans complete for its new paper mill within a few weeks. A lot of new machinery is being installed in the lumber plant at that place.

The Walking Wheel Traction Company is planning to install a factory at Spokane, Wash.

The Raymond Mfg. Company, operating a woodworking plant at Raymond, Wash., has installed electric power and is removing the old engine. More woodworking machinery will be required later.

The Pacific National Lumber Company has ordered a lot of machinery for a new mill on the Tacoma-Eastern Railroad in Washington.

D. E. Austin, located at the Smith & Watson Iron Works, this city, will hereafter represent the Frost Mfg. Company, Galesburg, Ill., boilers and engines.

The Dodge Mfg. Company, Mishawaka, Ind., is placing a full stock of transmission machinery at Fourteenth and Lovejoy streets, this city.

The town of Condon, Ore., is figuring on the installation of an electric light plant and a waterworks pumping engine.

Eastern Canada

TORONTO, ONT., July 29, 1912.

Crop prospects continue to exercise an inspiring influence on trade. The demand is sufficient to keep all works busy, and in some of the principal lines the fact that outside manufacturers are also getting a large business in Canada is not causing any concern, since that all the domestic manufacturers of such articles find it impossible to overtake the business they have booked. There is every reason to expect that there will be a veritable crush of trade this autumn. It will be fortunate if there is no serious congestion. The railroads will certainly have more than they can do, and unless they do their part with reasonable dispatch the strain on the note circulation may prove excessive, as Canada's stock of money now needs to circulate rather rapidly in order to suffice for the handling of the big fall trade.

There are forebodings of a shortage in the supply of binder twine. It appears that the demand in the Southern States this harvest has been unprecedentedly large and that therefore the calculations as to the reserve there would be left for the Northern harvests have turned out to be wrong.

The railroad rate question in western Canada is now being investigated by the Dominion Board of Railway Commissioners, and manufacturers in eastern Canada are awaiting the outcome with lively interest.

Several of the members of the Canadian cabinet, including the Prime Minister, are now in England. In London a few days ago a deputation of Welsh tin plate manufacturers waited on Hon. Geo. E. Foster, Canadian Minister of Trade and Commerce, with a petition to have a Canadian duty of 5 per cent. placed on tin plates imported from the United States.

The Superior Match Company is to begin very soon the erection of its \$20,000 factory in Owen Sound, Ont.

The Canadian Brakeshoe Company, Sherbrooke, Que., will build a foundry to cost \$30,000.

Tenders are called for the contract of constructing a factory for the MacDonald Thresher Company in Stratford, Ont.

A survey has just been made of 120 acres of land in Holmedale district belonging to the Waterworks Department of Brantford, Ont. The land will be distributed for industrial purposes, several deals for new factories being now pending.

B. J. McCormick, Industrial Commissioner, announces the location in Welland of the Northern Steel Company, Ltd., which has a capital stock of \$1,200,000. It will erect rolling mills for rolling sheets and black plate. The main building will be 150 x 600 ft. and equipped with a 10-ton crane. The construction of the plant will begin at once, with the object of opening the plant in February. Fifteen acres of land has been purchased. W. R. Glasgow, formerly works manager of the Canadian Steel Foundries, Welland, will be general manager.

The Russell Motor Car Company, Toronto, has filed plans for a new five-story automobile factory near its plant on North Keele street. The new building will be of reinforced concrete and will cost in the neighborhood of \$75,000.

Ham & Baker of Birmingham have concluded an arrangement with Port Arthur, Ont., for the erection of a factory there, the town to provide the site and the company agreeing to erect a factory which will pay \$25,000 taxes during the first ten years. The site is already chosen and arrangements will soon be completed for the erection of the factory.

The Malleable Iron Company, Amherst, N. S., is about to put up a building 100 x 250 ft. to double the capacity of its rolling mill and add a shop for the manufacture of car bolsters.

D. F. Jones Mfg. Company, Gananoque, Ont., is preparing to erect new buildings and double the capacity of its rolling mill plant and finishing shop.

The Spring Axle Company, Gananoque, Ont., is making alterations in its machine shop and installing machinery for the manufacture of automobile springs.

Mitchell & Wilson, Gananoque, Ont., will enlarge their planing mill plant and install electric motors and new machinery.

The Nova Scotia Steel & Coal Company will install steel presses capable of handling ingots up to a weight of 50 tons each.

The Hamilton Bridge Company, Hamilton, Ont., is about to erect a pattern shop.

The Bowden Machine & Tool Company, Toronto, is preparing to build a machine shop.

The Langmuir Mfg. Company, Toronto, will spend \$25,000 upon the erection of a new factory.

The Canadian Fairbanks Morse Company is building a factory in Toronto at a cost of \$65,000.

mill. The building will be made large enough to permit the plant to be increased to 1500 bbls. capacity.

The Mooney Seed Company, Regina, Sask., will build a 50,000 bushel elevator to replace the one recently destroyed in the cyclone disaster that overcame the city.

The Eby Foundry Company is starting the erection of a foundry at North Battleford, Sask. It will be ready for operation in about two months.

The Czerwinski Box Company, Ltd., Winnipeg, contemplates adding extensively to its capacity. Its present capacity is about 12,000 boxes and three or four carloads of furniture per week.

O. D. Sullivan and others of Hardisty, Alberta, are organizing a company to establish a large brick manufacturing plant there.

The Schilling Mfg. Company, St. Paul, Minn., will establish a branch factory in Winnipeg. It manufactures kitchen outfits, such as carving tables, steam tables, coffee and tea urns, portable bake ovens and other kitchen requirements.

Clark & Solsbaug, Boston, Mass., are arranging, it is said, for a site on which to erect a brass foundry in Edmonton, Alberta. The company has been in communication with the Edmonton Board of Trade for some time in that connection.

Plans are under consideration for the construction of machine shops at Lulu Island, B. C., for the Heaps Engineering Works, Vancouver.

The city of Moose Jaw, Sask., is considering the installation of a municipal steam heating plant. E. B. Bonnell is the city clerk and J. A. Pendure, Buffalo, N. Y., consulting engineer.

It is expected that the British Columbia Timber & Trading Company, Ltd., New Westminster, B. C., whose sawmill recently burned, will rebuild at Port Mann, B. C., where the company has bought a site.

The town of Canora, Sask., is calling for tenders for electric generating station equipment. The engineers are Bowring & Logan, 322 Donald street, Winnipeg.

The Alberta Farmers' Association, headquarters Calgary, will make an effort to secure legislation in that province similar to the elevator act of Saskatchewan, and if they are successful it will be followed by the erection of a large number of grain elevators.

The Dominion Government is calling for tenders for the construction of the 3,250,000 bushel terminal elevator to be erected at Port Arthur. It will include a grain drying plant with a capacity of 48,000 bushels per day.

The Edmonton Leather & Shoe Company, Ltd., Edmonton, Alberta, has been incorporated with a capital stock of \$100,000, and it will establish a \$30,000 factory there.

It is announced from Vancouver, B. C., that the Cowichan Lake Lumber Company will erect a sawmill at Cowichan Lake and another mill later on at a site already secured in the vicinity of Port Moody, B. C.

Estimates show the chief losses in the Vancouver fire of last week were: Champion & White, building and builders' supplies, \$450,000; Canada Malleable Steel Range Company, \$75,000; commercial cars stored in A. B. C. Motor Company warehouse, \$225,000; British Columbia Railway, \$50,000; Tudhope Motor Company, \$30,000; Palmer Investment Company, \$75,000.

Western Canada

WINNIPEG, MAN., July 25, 1912.

There is an excellent demand for different classes of machinery throughout western Canada. Many of the industrial plants in the leading cities west of the Great Lakes are being added to and there is considerable replacing of old machinery. Some of the flour mills are being overhauled with a view to having them in good running order for the fall work. The manufacturing industry of western Canada is still small in comparison with the consumptive power of the market here, and the capacities of the various factories are being added to almost continually. And hardly a week passes without a few interesting announcements regarding some proposed new industry. The crop outlook continues very favorable, and there is promise of activity in commercial and industrial circles in the coming season.

The Lake of the Woods Milling Company, Ltd., Montreal and Winnipeg, is enlarging the capacity of the flour mill at Portage la Prairie, Man., and generally improving the plant.

The Medicine Hat Milling Company, Ltd., Medicine Hat, Alberta, is preparing to build a new 500-bbl. flour

Government Purchases

WASHINGTON, D. C., July 29, 1912.

The Isthmian Canal Commission, Washington, will open bids August 6, under canal circular 722, for substation equipment, including transformers, switchboards and necessary adjuncts.

The Commissioners of the District of Columbia, Washington, will open bids August 5 for furnishing and delivering one steam road roller.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids July 23, under schedule 4671, class 56, for two fuel oil pumps as follows: Bidder 44, International Steam Pump Company, New York, \$7,885, \$8,050, \$8,655 and \$8,800; 71, National Electrical Supply Company, Washington, D. C., \$4,390 and \$3,328.50.

The United States Reclamation Service, Los Angeles, Cal., opened bids July 12 for furnishing transformers, motors, etc., for the Rio Grande project, N. M., as follows: Westinghouse Electric & Mfg. Company, Los Angeles, \$2,212; Allis-Chalmers Company, Los Angeles, \$2,342.25; Crocker-Wheeler Company, Los Angeles, \$1,852, incomplete; Wagner Electric Mfg. Company, St. Louis, Mo., \$2,069.48, incomplete.

Trade Publications

Wood Preserving Machinery.—Power & Mining Machinery Company, 115 Broadway, New York City. Bulletin No. P-3525. Treats of the process of preserving wood to increase its life and discusses the various ways in which this has been done from ancient days down to the present time. A concise description of creosoting process is given and this is supplemented by engravings and brief descriptions of the different pieces of apparatus required. Space is also given to the pumps and accessories which are furnished.

Molding Machines.—Arcade Mfg. Company, Freeport, Ill. Catalogue No. 24. Gives in a clear and concise manner the mechanical details of the company's molding machines and other foundry equipment. While the line illustrated covers almost the entire field of foundry production, at the same time the company is prepared to build special machines where one of the standard types will not meet the requirements. The line includes automatic, squeezing and jolting molding machines, all of which are illustrated and described.

Steam Traps.—Linton Machine Company, New York City. Catalogue. Size, 6 x 9 in.; pages, 16. Describes with the aid of half-tones the Komo steam trap for the separation of the water of condensation from steam from any source where economy is desired. Also treats of the Linton exhaust head, steam separator, muffler and oil extractor.

Resistance Thermometers.—Charles Englehard, 30 Church street, New York City. Pamphlet. Describes the Heraeus quartz glass resistance thermometer which is suitable for temperature measurements between 300 deg. F. below zero and 1300 deg. F. The resistance spiral is completely embedded in quartz glass and the resistance is adjusted to a standard value which gives the instruments long life and greater accuracy and at the same time enables them to be interchanged without the introduction of temperature error. Installations for indicating, recording and for signalling when maximum and minimum temperatures are reached are covered.

Forged Steel Valves.—Patterson-Allen Engineering Company, 2 Rector street, New York City. Pamphlet. Gives information concerning forged steel valves.

Wire Mill Equipment.—Morgan Construction Company, Worcester, Mass. Catalogue. Size, 7 x 10 in.; pages, 31. Sets forth a line of wire mill equipment for steel, brass, copper and bronze, including much accessory apparatus.

Central Station Apparatus.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Brochure entitled A Story of Central Station Service which in 30 pages tells much of the needs of central stations and describes the Westinghouse apparatus and methods.

Lubrication.—Chicago Pneumatic Tool Company, 1010 Fisher Building, Chicago, Ill. Booklet No. 117. In 11 pages this small booklet tells of the merits of the Rockford cylinder oil for use in gasoline engines and gives other information on lubrication.

Steam Traps.—American Blower Company, Detroit, Mich. Catalogue No. 326, superseding No. 266. Size, 6 x 9 in.; page 9. Devoted to descriptions of Detroit steam traps, separating, vacuum and condensing traps and their applications. Contains illustrations and useful information.

Drinking Fountains.—Manufacturing Equipment & Engineering Company, Boston, Mass. Pamphlet. Devoted to a type of sanitary bubbling fountain with ice-cold water supply for shop, factory and general use. Also describes adaptations of the bubbler device.

Steel Plate Fans.—American Blower Company, Detroit, Mich. Bulletin No. 331, superseding No. 263. Size, 7 x 9 in.; pages, 23. Gives description, data and illustrations of the ABC steel plate fans.

Motor Truck Operation.—Chicago Pneumatic Tool Company, 1010 Fisher Building, Chicago, Ill. Booklet No. 114. Size, 4 x 9 in.; pages, 46. An illustrated and indexed handbook for operators of motor trucks in general and the Little Giant in particular.

Air Compressors.—Pennsylvania Pneumatic Company, Erie, Pa. Catalogue No. 10. Size, 3½ x 6½ in.; pages, 24. Devoted to the Barr Unit Compound air compressor which it is asserted effects a reduction of 40 per cent. in space and foundation and has other merits. The steam and air cylinders are single acting, each with a one-piece trunk piston which engages the crank pin through a connecting rod.

Air Compressors and Apparatus.—Ingersoll-Rand Company, 11 Broadway, New York City. Folder. Illustrates and describes briefly the Imperial air compressors and some of the new models in pneumatic hammers, stoping drills, rock and plug drills and other specialties.

Gear Hobbing and Milling Machines.—Adams Company, Dubuque, Iowa. Circular No. 812. Size, 8½ x 11 in.; pages, 4. Illustrates and describes a new machine which cuts spur, spiral and worm gears automatically and may be used for circular or continuous milling.

Heavy Machine Tools.—Ernest Schieff, Düsseldorf, Germany, Wiener Machinery Company, 30 Church street, New York City, representative for the United States and Canada. Catalogue. Size, 9 x 11 in.; pages, 46. An illustrated book in paper cover designed to give a general idea of a line of machine tools designed for very heavy work, such for example as a turning and boring mill with a table 36 ft. 1 in. in diameter and weighing about 660,000 lb.

Disk Ventilating Fans.—American Blower Company, Detroit, Mich. Bulletin No. 330, superseding No. 315. Size, 7 x 9 in.; pages, 19. Gives description, data and illustrations of the Ventura disk ventilating fans which were illustrated in *The Iron Age*, May 18, 1911.

Motor Drive and Electric Motors.—General Electric Company, Schenectady, N. Y. Three bulletins. No. 4959, superseding No. 4649, and No. 4962, superseding No. 4641, show the advantages of individual motor drive in railroad shops and the lumber and woodworking industries respectively. A number of representative installations are also illustrated and described. No. 4963 describes a complete line of small motors of the draw-shell type ranging in size from 1/50 to ¼ hp.

Tool Steel.—Eagle & Globe Steel Company, Ltd., Sheffield, England, Drummond, McCall & Co., Montreal, Canada, agents. Pamphlet. Gives hints on the uses and treatment of tool steel and incidentally lists the various brands made by this company.

Melting Furnace.—Hawley Down Draft Furnace Company, 30 Church street, New York City. Circular. Devoted to the Hawley Schwartz furnace which employs either oil or gas as fuel for melting, refining and reducing various metals. The furnace is illustrated with a table of sizes and capacities and a number of testimonial letters are included. An illustrated description of a portable Schwartz melting furnace appeared in *The Iron Age*, October 12, 1910.

Power Transformers.—Wagner Electric Mfg. Company, 6400 Plymouth avenue, St. Louis, Mo. Miniature bulletin No. 92. Deals with a line of transformers for power service which are built in a wide range of sizes for different ratios of transformation. A brief description of the construction of the transformers is given with a number of views showing the various stages.

Milling Machine Dogs.—Ready Tool Company, Bridgeport, Conn. Folder. Calls attention to the company's milling machine dog which is made in two sizes giving a capacity of from ¼ to 2¼ in. An illustration of the dog in use is also given.

Lighting Reflector.—Nelite Works of the General Electric Company, 6523 Euclid avenue, Cleveland, Ohio. Folder. Concerned with the Nelite dome reflector for industrial lighting service. The reflector is said to give an excellent distribution of light without producing a glare. It is especially adapted for use in rooms with low ceilings or where the total area to be illuminated is large in comparison to the distance between units.

Boiler Tubes.—Parkesburg Iron Company, Parkesburg, Pa. Pamphlet. After an historical account of the development of knobbled charcoal iron, from which these tubes are made, the various types are described. Specifications and a table of weights are included.

Hydraulic Turbines and Sampling Machinery.—Allis-Chalmers Company, Milwaukee, Wis. Two bulletins. No. 1630 points out the advantages of using the company's horizontal and vertical hydraulic turbines with either single or twin runners in plate steel spiral casings for direct connection to electric generators. The various types are described briefly and tables of power and speeds are included. No. 1802 gives general description and specifications for a line of machinery and equipments for sampling ore. A number of sketches of suggestive plant layouts are included.

Blast Furnace Construction.—William B. Pollock Company, Youngstown, Ohio. Supplement No. 24 to the company's general book of views of blast furnaces. Calls attention to the blast furnace plant and the three hot blast stoves recently built for the Canada Iron Corporation, Ltd.

Core Ovens.—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin No. 31. Devoted to the reel type of core ovens which use oil, gas, coke or coal as fuel. These ovens are briefly described and the text is supplemented by engravings of some of the different styles.

Pneumatic Drilling Machines.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 8007. Devoted to the Little David pneumatic drilling machine which is adapted in its various sizes for all the ordinary work of a machine of this character such as drilling, reaming, tapping, flue rolling and wood boring. The motor is of the angular four-cylinder single-acting reciprocating type, each pair of pistons being attached to opposite throws of a double crankshaft and each acting in balance. These machines are made reversible, but can be made non-reversing by simply inserting a small pin in a hole in the throttle handle. A table of sizes and capacities is included.

Cast-Iron Boilers.—Lord & Burnham Company, Irvington-on-Hudson, N. Y. Catalogue No. 54. Lists a line of square and round cast-iron boilers which are intended for use for heating manufacturing plants having a large amount of exposed glass surface.

